Vol. 37, No. 1 March, 1911 Whole No. 137

United States Naval Institute

Proceedings

PUBLISHED QUARTERLY
EDITED BY PHILIP R. ALGER

U. S. NAVAL INSTITUTE
ANNAPOLIS — MARYLAND

BATTERY BOMFORD, OCT. 25, 1910. SECOND TRIAL 12" SHOT, SERVICE PRACTICE, FIXED TARGET, RANGE 8070 YARDS.
The photograph shows the projectile at the moment of reentering the water point down after having skimmed the surface for a distance of 90 ft. Photographed from tug by Private Geo. Doane, 123 Co., C. A. C., Student Department Enlisted Specialists, Coast Artillery School. Published by permission of the Chief of Artillery, U. S. Army

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The Lord Baltimore Press
BALTIMORE, MD., U. S. A.

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NOTICE.

The Prize Essay and one of two essays awarded Honorable Mention appear in this issue. Discussion is invited, to be published in the June number. The other Honorable Mention essay will appear in the June number.

Beginning with this number, the PROCEEDINGS will be printed on paper which, for the same number of pages, bulks only about 40 per cent of that hitherto used. It is hoped that this will be found an improvement.

The postcard of acknowledgment hitherto accompanying each number has been discarded owing to a ruling of the Post Office Department that its inclusion in the number took the latter out of the category of second-class mailing matter.

Special attention is called to the fact that beginning with this year membership dues are reduced from $3.00 to $2.00, and the cost of subscription for non-members from $3.50 to $3.00 per annum, with an additional charge of 50 cents, in the latter case, when the PROCEEDINGS are delivered outside of the United States.

UNITED STATES NAVAL INSTITUTE PROCEEDINGS.

Vol. 37, No. 1. MARCH, 1911. Whole No. 137.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

PRIZE ESSAY.

NAVY YARD ECONOMY.

By PAYMASTER CHARLES CONARD, U. S. Navy.

"If it were done when 'tis done, then 'twere well it were done quickly."

INTRODUCTION.

To those who have followed the numerous discussions of navy yard industrial methods during the last few years, and who have been interested in the changes and developments which have been taking place, it must have been apparent that there is considerable indefiniteness surrounding the claims and counter-claims for the various systems of management and administration, so far as the ability to prove, on the part of adherents of the plans adopted or proposed, that their methods do or would produce the most economical and satisfactory results. Of the methods actually tried it may be said that while great improvements over the old *laissez-faire* policy have undoubtedly been effected, it has been most difficult to show specifically where and to just what degree economies have resulted.

For every advocate of one plan who cites figures and instances to prove the efficiency of the work done while his system was in vogue there instantly appears an opponent who not only produces other figures and instances to strengthen his arguments, but who also proceeds to cast considerable doubt on the accuracy of the figures on which the first gentleman's arguments were

based. Thus the impartial observer—if there be any such—is apt to be somewhat confused.

It is the purpose of the writer of this essay to outline a few of the necessary elements of administration and accounts which he believes would, if adopted, largely obviate the difficulties referred to, and render it possible to obtain a better standard of comparison among any and all methods which may be tried. No consistent or detailed description of an administration and accounting system as a whole will be attempted. A certain familiarity with the present methods of our navy yards will be assumed, and remarks will be confined solely to those particulars wherein improvements are recommended.

Readjustments of navy yard organizations and new distributions of authority over component parts will never of themselves produce great economies. Brooms will sweep clean when new, but before long dust accumulates in the old crevices. Unless a constant incentive urges us forward, not only do we fail to progress, we fall back.

The writer is not one of those who believes that authority placed in the hands of one set of men will necessarily produce better results than when in the hands of another set. It seems far more important that a clear definition of the results expected be set down, and that a reasonably accurate system of comparison of efficiencies be developed. The results will then soon prove who are the men most capable of wielding authority.

The subjects covered in the following pages have been, for the most part, largely discussed in recent months. But the writer regrets to state that no great advance has been made towards the solution of the problems involved, although conditions have been improved. By presenting the subject matter at a slightly different angle, and by the introduction of a new element—a record of profit and loss—it is hoped that a well-worn theme may have a certain new interest for the reader.

Some of the steps recommended in this essay are already in effect, as, for example, the division of yard expenses into "Military" and "Industrial." But the writer has deemed it well to go over the ground, as there are many who are opposed to such division. It is also noted that a new system of estimating for the annual appropriations has been put into effect. The writer has not seen this system, and his remarks refer therefore to the methods followed for the current appropriations.

GENERAL REMARKS ON ECONOMY.

There is probably no one who will not admit that economy is a good and desirable thing. In the abstract it is acknowledged to be essential in any undertaking in which effort is measured in terms of dollars and cents. In practice, however, it is not always so easy to get complete agreement as to the desirability of economy. In any given venture there are usually a certain number who maintain that attempts to economize in this particular instance will tend to jeopardize results. Whenever the project is a governmental one the tendency to eliminate economical considerations is apt to be marked, and this is especially so in the case of military affairs. The reason of this is that military expenditures are not usually to be measured by results attained, it being felt that a striving after economy may tend to paralyze, in some degree, the efficiency of the military system. Thus, from a purely military standpoint, it often appears that the introduction of too many economical methods in the industrial work leading up to military purposes serves but to retard the attainment of those purposes to the fullest extent. In other words, too much economy results in a "penny wise, pound foolish" policy.

This view is arrived at owing to a confusion as to what really is meant by economy. While, in a narrow sense, the saving of so many dollars and cents in a given series of operations may be called economy, it is of course no actual economy in the broader sense, if the final results to which the series of operations leads are impaired by such savings. Every one knows this; nevertheless, in ordinary discussions this distinction is frequently overlooked.

In the naval world, industrial operations are carried on for the purpose of preparing and maintaining ships for war. There are definite objects to be attained—so many ships to be built, so many ships and outfits to be repaired, so many technical devices to be installed, etc. As long as these objects are attained fully and on time, it is not, to the military mind ordinarily, a matter of exceeding moment whether the most economical methods have been used in their attainment, or not. Of course, all admit that it would be well if these things could be done more cheaply, and that it is a duty owed to the government to be as careful as possible in the expenditure of its funds. On the grounds of patriotism and honesty all would like to see avoidable losses eliminated.

It is thought, however, that it has not occurred to the service generally that industrial waste (meaning less economical methods than those possible) means a direct loss in military efficiency. That this is so may be shown in the following way:

The navy has grown tremendously since the Spanish War. The money appropriated annually by Congress for the navy has been:

NAVAL APPROPRIATIONS FROM MARCH 3, 1901, TO JUNE 24, 1910.

March 3, 1901	$ 78,101,791.00
July 1, 1902	78,856,363.13
March 3, 1903	81,876,791.43
April 27, 1904	97,505,140.94
March 3, 1905	100,336,679.94
June 29, 1906	102,091,670.27
March 2, 1907	98,958,507.50
May 3, 1908	122,663,885.47
March 3, 1909	136,935,199.05
June 24, 1910	128,958,704.76

From an inspection of this table it is seen that our naval expansion has been very rapid in the last decade. During this period the demand on the part of the country at large for an increased navy was so great that Congress appropriated money for that purpose in increasing amounts each year. The cry for economy has gone forth, however, and it is a reasonable expectation that for the next ten years our annual appropriations will hardly exceed on the average those of the last two years. That is to say, it has now come to the point where the main question is not, "How many vessels and armaments is it wise to add to the fleet each year," but "How can we best expend the appropriations available," since it is evident that our increase and maintenance will be limited strictly to the funds Congress and the people are willing to expend for that purpose.

If, in a conflict five years from now, we are able to place in line of battle one vessel which, as the result of economy in industrial methods, amounting to two millions of dollars per year, we are able to obtain in addition to those we would procure under our ordinary methods, it is evident that economy has directly aided military efficiency, instead of retarding it. This example, while crude, is no exaggeration. It is possible to save fully two million dollars per year, by proper methods of administration, accounting and accountability. And since Congress, and the people at large, will probably permit the expenditure each year of at least as much

as is now being expended, the saving will accrue directly to the navy, and thus increase its efficiency.

The above argument is not advanced as new or original with the writer. It is pretty generally recognized as being true by those who have given this subject much thought. It is merely cited here as the basis upon which the balance of this article rests.

It must be perfectly evident, therefore, that the study of economy in naval expenditures is by no means a theoretical subject, but a living, practical issue, calling for the best thought and most earnest effort. The conservation of our resources—naval appropriations—is perhaps the most important military problem now before those engaged in proper preparation for war. Of the total expenditures each year for the naval service, about one-half is made through the various navy yards where industrial work is carried on. The other half consists of purchases of new ships and equipment, pay and subsistence of personnel, etc. It is not the purpose of this article to discuss expenditures under the last mentioned section. The half expended at the navy yards and stations alone will be treated, as it is here that the larger economies are believed to be possible.

THE DIFFICULTIES IN THE WAY OF ECONOMY.

It is believed that the necessity for economizing is apparent to all. It is recognized on every side that too much money is expended for the results obtained. Yet the many difficulties surrounding the case have led most people who have carefully considered the subject to conclude that a large part of the waste is unavoidable. They all see clearly that many elements are present in governmental industrial work which do not have to be contended with in ordinary commercial life. Such are: (1) the military necessity of maintaining shops and laborers to meet sporadic demands of the fleet, such shops and laborers being often not fully employed, (2) the political influences affecting government industrial work, causing yards and stations to be maintained which are really unnecessary, (3) the eight-hour law, which has the effect of increasing the rate per hour paid, (4) the granting of leave and holiday, and the payment of disability claims, (5) the absence of the incentive found in the commercial necessity of producing profits, (6) the alleged impossibility of comparing costs at various yards, owing to the varying conditions

of equipment and rates of wages paid, to say nothing of comparisons with commercial costs, (7) the complicated appropriation system, which, having for its object the limiting of expenditures by means of express stipulations concerning the objects for which the money may be spent, has actually become so involved and interwoven as to be useless for such purpose, while, on the other hand, it throws a large volume of unnecessary work into the accounting records; such are the main difficulties confronting those who would, if they could, efficiently administer the funds of the naval establishment.

It is the hope of the writer that he may be able to show how some, if not all of the obstacles mentioned may be overcome; and that by degrees a system may be set up which not only will permit the more economical operation of government plants, but which will point the way to methods producing results at least equal in efficiency to a majority of the commercial plants.

Looking at this problem in a broad way, it would seem that conditions exist which should warrant the final development of a thoroughgoing economical system. The navy possesses a number of independent industrial concerns, which, judging from the history of industrial development in the United States, are capable of being welded into one vast corporation, under one general management, in which economies can be introduced which would not be possible if the plants were run separately. We have every reason to believe in the efficiency of this method of doing business. Furthermore, we are in the favorable position of a group of financiers who undertake such a consolidation of plants unrestricted as the available capital to use in putting their plans into effect. It is not a question with us of recognizing the necessity of reforms but not being able to go ahead with them on account of lack of funds, a condition often met in the commercial world. We are not under the inexorable necessity of paying dividends and interest on capital continuously, or going into the hands of a receiver. Any well-defined plan which promises economy in the long run can be put into operation at once, even though the results may not be expected to manifest themselves for a year or more.

If we can but once rid ourselves of the idea that the task is practically hopeless (an idea more common than is generally admitted), it is quite possible to make rapid strides toward the goal

of efficiency and economy in industrial work. The government is able to employ the best talent available for the purpose. All that is needed is for the problem to be definitely set forth and scientifically attacked.

After all is said and done, it will probably be admitted that the real, underlying reason for extravagance in government work is due to the lack of incentive toward economy found in the commercial necessity of showing profits under competition. If that, or an equally good incentive can be furnished, the problem is a long way toward being solved.

Now, just what is this incentive in commercial life which leads to the refinement of processes, the reorganizations of business and the vast combinations of capital for scientific and economical production? Is it the desire to make money, to pile up fortunes, on the part of certain capitalists? While that is the result which is most apparent to the eye of the public, I do not think it is the real underlying reason for the achievements in industrial work which so astonish and charm the imagination.

It is rather the desire implanted in the breasts of some men to achieve results, to do good work, to use their science and education to make two blades of grass grow where but one grew before. Men, absorbed in the delights of scientific and engineering achievements, think very little of the cash returns coming to them individually. And even the industrial managers, the men who solve the problems leading to organization and commercial efficiency, themselves obtain but a small part of the financial reward. True, these men are all well paid, and that fact undoubtedly influences their actions. But it is the desire to achieve, to better the performances of those who preceded them, that furnishes the real incentive for their efforts. Even the capitalists themselves, those men sufficiently astute to reap the results of others' industry, are often enough actuated mainly by the same motives—to excel others.

This leads to the conclusion that cash returns are not absolutely necessary for the proper development of industrial work. Does the present efficient management of the Panama Canal construction depend upon the profits being made by the engineers in charge?

The incentive for commercial efficiency is the desire to excel. This same incentive can be utilized in our navy yard plants. Only,

in order to obtain fair competition, the conditions must be such that those competing are cognizant of all the rules and details concerned. And since the competition is to be not only among our own yards, but with commercial plants also, we must be governed by the same rules and conditions governing them, so far as may be practicable.

It is the function of a well-developed accounting system to show clearly and accurately the results of efficient work, to indicate the errors that need correction, and to draw attention to the differences in methods instituted in the various plants, so that the best elements of each may be adopted for all. Such an accounting system should permit of no expenditures being made which in any way affect the plant, without registering accurately and clearly the effect which such expenditures have upon the plant's production. In other words, the product of a plant, when stated in terms of value, must include all the elements of effort, measured in dollars and cents, which have gone to make up that value.

In the government service the cost of a manufactured or repaired article should mean the expenditure which has been necessary to obtain that article or make that repair, being comparable with the expenditure necessary to purchase the article or have the work done by private plants. Anyone who thinks of the "cost" of a government manufactured or repaired article immediately compares such cost in his own mind with what he thinks would be the cost if the work had been done outside. It is psychologically impossible to speak of "cost" without making some such mental comparison, no matter how unconsciously it may be done. Therefore, to say that government "costs" cannot be considered in the same light as commercial "costs" is merely a contradiction in terms. If we wish to substitute for "cost" a "near cost" that is, cost with certain elements eliminated, it will be necessary to use some other word or phrase to express our meaning. Otherwise it must be apparent that we will be continually deceiving ourselves and others, since long habit has made it impossible to prevent the mental comparison to which reference has been made. Of course we could always bear in mind that our costs are different from commercial costs. At least, we could theoretically. But practically we soon leave off the habit of this mental adjustment, and commence comparing in our minds our "near costs" with commercial "costs." Furthermore, it is simply impossible to

make others, outside the government service, remember that we mean "near cost" every time we say "cost" in connection with government work.

It will be well to analyze here just what is meant by commercial cost. In the case of a private plant manufacturing articles or making repairs, costs are commonly ascertained in three stages. Assuming that the plant is divided into several departments, or shops, as most well organized plants are, the article manufactured or repaired has charged to it the labor expended directly on it, the material used, and the "overhead" or "indirect" expenses of the departments or shops in which it has been handled. The summation of these charges give what is commonly called the (1) "factory cost." But in order to produce the articles or make the repairs, the expenses of the managing and office force must be considered, as well as all other incidental expenses not chargeable through the shops. By the addition of these elements we get the (2) "production cost," that is, what it actually cost the private plant to produce the articles. Next to be considered are the expenses of marketing the articles, or obtaining orders for repairs, as well as the profit to the plant, so that we finally come to the (3) "selling cost." The last is really a misnomer from the point of view of the plant, but is quite correct from the point of view of the consumer. In government work we have (1) factory cost and (2) production cost, but not (3) selling cost. That is, our (2) production cost is really our ultimate cost, since we carry the process no further. Or, to put it another way, the third element is zero. Therefore, in comparing government costs with commercial costs, it is quite clear that it is our (2) production costs, which are to be compared with commercial (3) selling costs. Thus, in using the term "commercial cost" it is to be understood that the selling cost to us as consumers is meant. All elements of expenditure made by us to produce articles should then be included in our "costs," just as all elements included in the selling price are included by private firms before we obtain the articles from them.

Having thus clearly fixed in our minds the fact that the results of our productive effort, stated in commercial terms, must include all those elements which are commercially considered as parts of productive effort, and which are in fact necessary towards the realization of the results of production, we next come

to the problem of providing a method by which a measure of efficiency may be obtained in government industrial plants, in the absence of the usual commercial profit.

The plan to be proposed depends upon the fact being granted that the incentive for commercial efficiency is, as the writer has attempted to show, the desire to excel, rather than the actual pecuniary gain immediately accruing to those who make the efforts towards such efficiency. It should be fully understood, however, that this does not mean that pecuniary reward has no weight in the matter. The distinction which it is desired to make here is this: Economic conditions are brought about by the desire to excel, to better the record of someone else. The reward for *having excelled,* is, in commercial life, usually a pecuniary one. It could, just as well, be "honor and distinction," were "honor and distinction" prized as much as money. Frequently the reward usually does consist of the former, rather than the latter. In governmental work, and specifically, in the navy, the reward must usually consist of honor and distinction, with pecuniary benefit to the individual eliminated.

Inasmuch as it is commonly granted that the desire to excel produces beneficial results in such things as target practice and steaming competitions, one may be warranted in believing that it will also serve as an adequate stimulus in the matter of industrial efficiency, provided the contest can be conducted in such manner as to guarantee fair competition. As a matter of fact, it is believed that the contest for supremacy in industrial efficiency can be made along fairer lines than in the cases mentioned, if the facts are gone into thoroughly, because the measure of efficiency will be that tested by long years of commercial practice, whereas in target practice and steaming contests the field is new, and the weights given to the various elements are necessarily experimental.

THE MEASURE OF EFFICIENCY.

The "Profit and Loss" account measures the efficiency of a commercial plant. The distribution of earnings in the form of dividends, etc., marks the point where governmental plants must cease to step side by side with the commercial plants. Up to that point, however, the progress of the two can be compared stage by stage, and though differences will be found to exist, they will

not be of such character, nor so great in amount as to prevent fair comparison. Let us then adopt a "Profit and Loss" account in our naval industrial work, cast as nearly as possible along the lines of the same account in commercial practice. The benefit will be twofold. First, comparison with commercial plants will be practicable (and impracticable otherwise), and second, a fair standard of comparison among our own navy yards will be supplied.

The above is the writer's view of what should be done. Just how it may be done will be set forth in sufficient detail to prove, it is hoped, that it can be done. The description of the "Profit and Loss" account to be clear must follow the discussion of the steps leading up to it, and will therefore be placed later on in this essay.

THE MILITARY POST AND THE INDUSTRIAL PLANT.

A navy yard has two separate and distinct functions, (1) that of a military post, and (2) that of an industrial plant. Expenditures made on account of a navy yard may be for the military post, for the industrial plant, or partly for one and partly for the other. It is essential that all expenditures should be classified and divided between these two objects, before any attempt is made to ascertain the costs of production of the industrial section.

The military post covers that function of the yard which might still continue to exist were no industrial repair or manufacturing work carried on. It is possible to conceive of a yard in which ships would come for the purpose of receiving and discharging stores, transferring officers and men, carrying on drills, etc., and sometimes going into reserve, or out of commission. All repair work would be done by private contract, as occasion demanded. This yard would be a strictly military post, analogous to an army post in practically all respects.

All of the above things are done at our existing yards, and in addition an industrial plant is kept operating for the purpose of making repairs and manufacturing articles required by the ships, instead of reliance being placed on private contractors. It may be objected that the whole yard is really military in its function, since it is purely for military reasons that repair and manufacturing work are done in them at all. That is to say, were it not for the military necessity of having plants ready and available at all

times and particularly in time of war, to make repairs or provide articles needed immediately (and for which it would be unwise to depend upon the resources of private plants possibly unable to accept the work), there would be no need for governmental navy yard industrial plants at all. Except for the military reasons, all work of the nature indicated could well be done in private plants.

The reply to this argument is that while our navy yard shops are maintained for military reasons, they are nevertheless industrial plants which military policy requires us to keep up. Their functions as industrial plants are clear and distinct. The very fact that the work they do could be done by private plants goes to prove this assertion; for, we have only to segregate those expenditures made by us in order to do this work which might be done by private plants, and we have the "industrial expenditures" clearly defined. Furthermore, it is only consonant with good business administration for us to keep an exact record of what the cost is to the government of the military policy which requires us to maintain these industrial plants, to be compared with another policy, the cost of having the same work done elsewhere. And if in the course of time we can show that the policy we adhere to for military reasons costs the government no more than the other policy, we shall have quieted all opposition to the methods we have adopted for military reasons. That time is far distant, but it will arrive.

If any who read this are of the opinion that the cost of naval industrial work is so intimately involved with military expenditures that there can be no real comparison with commercial work, it is pointed out to them that the adoption of such a view renders it hopeless to attempt to achieve any real economies in our plants, since no basis of comparison could ever be used which would not be nullified by the intangible military element. It is, therefore, worth while to adopt the contrary view, and give it at least a trial.

The military expenses of a navy yard include the maintenance of buildings, grounds, sanitary arrangements, walks, fences, piers, sea walls, craft and vehicles, etc., which are used for military purposes and in general all those expenses which the military part of the yard necessitate. There are some expenditures which are made partly for the industrial and partly for the military section of the yard. All of those should be divided according to the benefit accruing to each section. When any expenditure is to be

made it should be subjected to the following test: "Does it in any way benefit or assist the production at the yard?" If the answer is "Yes" the expenditure should be classed as industrial. If the answer is "No," the expenditure should be classed as military. If the expenditure is clearly for the benefit of both military and industrial plant it should be charged proportionately to both. The writer would not be warranted in going further into the details of this division of expenditures here. It can be stated, however, that the details have been worked out, and that they are practicable.

The question of economy in the industrial portion of the yard will now be taken up, but first let us recall a conversation which took place during a hearing before the House Naval Committee last winter. The quotation is as follows:

MR. PADGETT.—Now, then, how would it do to make the whole establishment in the navy yard industrial along the same line that the industrial yards of the country are, and let them bid for their work at the department in the same way that they would bid or that bids would be submitted by the private concerns?

ADMIRAL CAPPS.—I think I fully understand your proposition, Mr. Padgett, and it is rather fascinating as a proposition, but it has many practical difficulties.

The chief constructor then illustrated the difficulties of specifying in detail the exact nature of contemplated work, in order to secure bids. These difficulties are indeed great. The writer believes, however, that they can be overcome, but only after a thorough revision of the navy yard financial system. More will be said about this question under the heading of estimates. The "fascinating" proposition was so exactly in accord with the writer's own view that he cannot forbear quoting it. While it may not be practicable or desirable to have our yards actually compete for business with private plants, it certainly should be possible to compare costs accurately with those of commercial concerns. To do this we must make the yards industrial "along the same line that the industrial yards of the country are."

COMPARISON OF EXPENSES IN PRIVATE AND GOVERNMENT INDUSTRIAL PLANTS.

It is frequently stated that government plants work under a serious disadvantage, as compared with private concerns, in that the former have expenses which the latter do not have to meet.

The examples most frequently quoted are (1) the eight-hour law, (2) payments for leave, holiday and disability, and (3) higher rates of wages. These are the most serious obstacles to successful competition with commercial output. Let us examine them in detail and see what effect they have on our navy yard costs, and then take up the other side of the question, expenses of private plants which our plants do not have to contend with.

(1) The eight-hour law.

The tendency to reduce the hours of labor has been very marked during the last two centuries. Against seemingly insurmountable obstacles the number of hours per day which the laboring class must work in order to obtain subsistence has been gradually reduced. Legislation has many times been employed towards this end, and signs are not wanting that it will be frequently used successfully in that direction in the future. The normal period for factory workers is now about ten hours per day. It is urged by those in favor of reduction of this time that the output of a laborer working eight hours per day will equal that of the same class of man working ten hours, the argument being that ten hours is too long for efficient work throughout the day. Whatever may be the merits of this argument, let us ignore it, and assume that of two men receiving the same wages, the one working ten hours does 25% more work than the one working eight hours. Then for work done in a government plant the labor cost will be 25% greater than the same work done in a private plant, assuming that our eight-hour man receives the same daily wages as the ten-hour man. The extra expense due to the eight-hour law is then, under the above assumption, 20% of the total labor cost. The expenditure for labor at the New York Navy Yard during the fiscal year 1909 was $3,913,594.53 (exclusive of pay for leave, holidays and disability). Twenty per cent of this amount is $782,718.91, which represents the cost of the eight-hour law at the Navy Yard, New York. During the same year the expenditures at this yard were, for leave, $140,143.18, for holidays, $136,721.03, and for disability, $9,652.48.

The rates of wages at our navy yards are theoretically the same as in the surrounding industrial plants. As a matter of fact they are nearly always slightly higher, since each trade receives the highest rates paid in surrounding plants. If it is considered that in any given private plant, some trade will receive a somewhat

greater rate of pay than the same trade in other plants, but that in no plant do all the trades receive this increase, it will be seen that where a navy yard pays the high rates of each plant, and the low rates of none, its general average of rates must be higher than the general average of any one private plant. At a guess, assume that of the total wages paid, 5% covers this increase in rates, and we get $195,679.73 as this extra cost. We have then

(1) Eight-hour law	$ 782,718.91
(2) Leave, holiday and disability	286,516.69
(3) Higher rates of wages	195,679.73
Total	$1,164,915.33

This is a pretty heavy bill for one navy yard to pay annually on account of the items specified, even though it is our largest yard. Each of the others pays much less. But let us now consider certain items with which private plants must be charged before their product can be delivered to us as consumers, and which are not charged to our plants. These are (1) interest, (2) taxes, (3) legal expenses, (4) advertising, (5) selling expenses, (6) dividends on stock, and many others. For purposes of comparison we will confine ourselves to but one of these, the last mentioned, dividends on stock.

The industrial plant of the Navy Yard, New York, is worth roughly, $20,000,000.00. Such a plant, privately owned, would be bonded for about that amount.

In addition to the bonds, however, stock to a value at least equal to the bonds (very probably more) would be issued, representing the good will, or going value of the concern. Annual dividends must be declared on this stock, and if the plant is at all successful, these dividends would be at least 6%.

As has been stated, this amount must be covered by the selling costs, and would have to be paid by us as consumers (that is $1,200,000.00). Here is an item which of itself is greater than the extra labor costs of the New York Yard which have been itemized. This one item has been picked out as having a peculiar interest. It represents the amount accruing to the shareholders, that is, the partners in the enterprise. The writer suggests therefore that in our naval accounting the amounts paid for short time (eight hours instead of ten), for leave, holiday and disability, and the slightly higher rates of wages, be considered in the same light as

dividends, the workmen themselves being the shareholders in the enterprise. This subject will be further touched upon under the "Profit and Loss" account, and "The Workman's Point of View."

The writer is fully aware that the comparison made above is far from exact. A private plant with an investment of $20,000,000.00, would probably produce a much greater output than does the New York Navy Yard, in order to pay an annual dividend of $1,200,000.00 in addition to the interest on its bonds. But, on the other hand, the New York Yard, under different and improved methods of financial and administrative management, could equal the output of the private plant, without appreciably increasing the extra labor expenses which have been cited.

It is believed that the foregoing will serve to show that many of the claims advanced in connection with high government costs, will, if analyzed, find offsets in private costs, and that there is still "a fair field and no favor." As a matter of fact, it will be found, after thorough examination, that the ordinary expenses of a navy yard plant, after providing for the extra labor costs as indicated above, will be closely similar to those of the usual industrial plant of the same caliber. That is, assuming of course that the purely military expenses have been properly segregated, a problem of no great difficulty when carefully studied. But before going further it will be necessary to consider the capitalization of navy yards.

CAPITALIZATION OF NAVY YARDS.

In order to arrive at any just estimate of the value of work, the value of the tools which have been used must be considered. It is perfectly apparent that work which is the result of manual labor only has far less value than work which employs the same amount of labor, but which also utilizes expensive machinery and plant facilities of all kinds. The amount of capital invested in an enterprise is evidently, therefore, an essential element towards arriving at a fair appreciation of the cost involved in turning out work.

A navy yard being both military and industrial, the capital investment will fall into these same divisions. A certain number of buildings, grounds and utilities of various kinds have been placed in the yard on account of its military functions, while

others are there only for industrial reasons. A large proportion of the capital investment is used for both military and industrial purposes, as for example, the grounds, paving, sewerage, wiring, etc., which serve all parts of the yard. In such cases an estimated division must be made, assigning to the military and industrial capital accounts such portions of the common properties as seem most equitable, taking into consideration all the purposes and uses to which all such properties are put. In some instances a fairly simple calculation will determine the proper division, as for example, the sewerage system, whose cost would be divided, other things being equal, according to the values of military and industrial buildings served. Other properties, such as the sea wall, must be divided on a purely estimated basis, and considerable care should be given to this division. The expenses of maintaining each division of property should thereafter be classed as "military" or "industrial" as has already been explained.

It has been the usual practice of the Navy Department to take a decennial inventory of its navy yard properties, but the division indicated above has not been undertaken, as the inventories so made were not intended to be further utilized in any general accounting scheme. Therefore, such inventories, or valuations, have not played a very important part in naval accounting, although they have served to give a general idea of the value of the navy yards.

In the great railroad rate controversy now before the country, the proposed physical valuation of the roads plays an important part. The government experts contend that before rates can be passed upon with any degree of justice, it is essential that the capital invested be known, in order that proper allowances may be made for interest on such capital, as well as for the necessary annual depreciation of machinery and equipment, etc. "Capital invested" does not mean here the values of stocks and bonds issued, as that is easily determined, but the actual present value of the properties.

Involved in this question is that of the value of the "good-will" of the companies, and other considerations, which lead the railroads to cling to the theory that the proper rates are "all that the traffic will bear." With the last mentioned element we are not concerned, but the question of physical valuation is one that interests us, since we also should determine, by appraisal, what the book values of our navy yard properties are.

In a private plant the value and kind of the property determines the expenditures which must be made for (1) interest on capital invested, (2) taxes, (3) depreciation, (4) insurance. To what extent does the value of our properties affect our expenditures?

We pay no interest on capital invested. The funds advanced by the government for the construction of our plants are regarded as expenditures simply, and not as capital in any sense. It has occurred to the writer that it would be equitable to charge against our plants the average rate of interest which the government pays on its outstanding bonds. But this would be a purely fictitious charge, and if actually carried out, would simply result in certain repayments to the general treasury of funds advanced, that is, a reduction of appropriations. Therefore, as matters now stand, no possible advantage would accrue by the charging of interest against our plants, since no such expenditure is actually made.

This opens up the rather interesting question as to whether it would not be advisable for the government to issue bonds for all new construction work such as the building of navy yard plants, instead of paying such amounts directly from yearly revenues. That this would be no new departure is shown by the fact that the Panama Canal is being partly constructed through a bond issue. In the writer's opinion it would be far better if the entire cost of the canal were covered by bond issues, instead of partly, as at present. When the canal is completed, and the problem of the proper toll rates is to be solved, this question of interest charges on bonds will assume considerable importance, and it would be much better if the whole construction cost were then found to be on a recognized sound financial basis.

Our navy yards could very well be bonded, and thus placed in a business like and satisfactory situation. However, there is not space here to go into a detailed discussion of this subject. They are not bonded, and, therefore, there are no interest charges.

As regards taxes, the situation is much the same. Private plants do not pay taxes to the national government, although they do pay State and city taxes. Were it otherwise, it would be proper to charge against our navy yard plants the value of taxes which would be assessed by the national government against a private plant in the same place, since the navy yard plant may be assumed to supplant a private organization of the same capacity. Conditions being as they are, however, it is necessary to ignore taxes also.

Both interest and taxes might be charged on a theoretical basis, but many difficulties would be involved, and further, it is believed that only actual expenses should be included in our calculations. We do not wish to compare what we might or should expend, but only what we do expend, with the expenditures of commercial plants.

When we come to the subject of depreciation, however, we are no longer on really debatable ground. There is no question that a government plant depreciates, and consequently suffers loss leading to expenditures for that reason. This subject is so important that a separate heading will be given to it. In this connection it is interesting to note that again a parallel can be drawn to the railroads of the country, which were at first opposed to the plan of charging an annual depreciation against their properties. They have, however, become reconciled to the rulings of the Interstate Commerce Commission, requiring this to be done.

DEPRECIATION IN NAVAL PLANTS.

Any plant doing industrial work necessarily suffers wear and tear, which must be offest by renewing and replacing parts. Also, machinery gradually gets out of date, and even though it may be still in good condition structurally, it has nevertheless lost value through obsolescence, and must from time to time be replaced by newer and better types. Thus, in order to maintain a plant at its full value, constant expenditures for new parts must be made, this being entirely independent of increase in size and value of plant made in order to increase the plant's capacity. It is apparent that such expenditures for renewals and replacements are in reality part of the plant's running expenses, and that it is necessary to provide for them, and to consider them when ascertaining the cost of the work produced by the plant. If a shoemaker, in estimating the prices at which he could afford to sell shoes, should overlook the cost of keeping up his supply of tools, he would soon find that he was running behind. The principle is the same in any industrial plant.

While the science of accounting was yet young, it was customary to add to the year's expenses the costs of new tools and equipment, when calculating the costs of production. It was found, however, that this direct method was unsatisfactory in its results, on account of the fact that the expenditures for renewals

and replacements during any one year failed to bear a proper relation to the actual wear and tear, and obsolescence during that year. Thus a new plant would, during its first few years, have very few renewals and replacements to make and the costs of production would accordingly be figured to be much less than in succeeding years, when large expenditures had to be made for new machinery and equipment. As a result, costs fluctuated to an unreasonable degree, being too low in the early years, and too high in later years. To meet this difficulty the method of calculating depreciation was devised. This is nothing more or less than the estimated loss by wear and tear, and obsolescence, per year. For example, it has been ascertained that machine tools last, on the average, from 16 to 20 years, after which they must be renewed. Therefore the depreciation rate on machine tools is placed at 5 or 6 per cent per year. This is on the assumption that the loss in value per year is the same throughout the available life of the tool, which is not strictly true, but sufficiently close, as we are only dealing in averages anyway. By fixing a depreciation rate of say 5 per cent on all machine tools in a plant, it is not intended to convey the idea that any one given tool will last just 20 years and should then be discarded. Many machine tools last much longer than this and still render good service. On the other hand, it is often necessary to replace a tool only 8 or 10 years old. But taking all the tools together, over a term of years, experience has shown that the average life is from 16 to 20 years, in plants of the character of our naval establishments. Other kinds of equipment have different rates of depreciation. There are good engineering and accounting precedents for each.

By the use of depreciation, then, it was found that the average loss in value could be charged up each year, and in fact, each month. By the opening of suitable accounts in which the estimated depreciation charged appeared on one side of the ledger, and the renewals and replacements actually made appeared on the other, a check could be obtained over a term of years, and the estimated depreciation could be adjusted accordingly. In commercial practice "Depreciation Reserve Funds" are established, to which are turned over each year the amounts deducted from income on account of estimated depreciation. The costs of renewals and replacements are than defrayed from these "Depreciation Reserve Funds" as fast as new equipment is needed. In

the long run it is expected that the amounts placed each year in the "Depreciation Reserve Fund" will approximately provide for all renewals and replacements of parts of the plant, necessary to maintain it at full value. New plant and equipment which are extensions to the original plant and so increase its value are not paid for from this fund, but require additional capital for their installation. This is one of the difficult problems in industrial accounting calling for considerable skill in its solution. That is, whether a new machine, or other equipment, supplants an old one, or whether it is a direct addition to plant. Common sense and judgment are necessary for a correct decision in each case.

So much for depreciation as handled commercially. The question now is "What necessity, if any, is there for including this element in naval industrial accounts?" The arguments against it are (1) the navy not being a commercial organization, must not endeavor to follow too closely commercial accounting practices. (2) The subject is a theoretical one, not a practical one. (3) The inclusion of depreciation in naval costs would make them excessively high. (4) Congress has not provided for depreciation funds, nor intended that current appropriations should bear such a charge.

There are doubtless other reasons which would be advanced by opponents of the depreciation theory. But in answering these four it is probable that the other objections will be met.

In regard to (1) the writer has already explained his views, and has expressed the belief that we should not use the word "cost" unless we mean "cost." Depreciation of plant is a highly important element of cost. Where depreciation accounts are not maintained in private plants (and it is getting rarer and rarer to find such plants) all replacements and renewals of plant are charged directly as part of the running expenses, and so prorated to the cost of production. In the long run this brings the same results, but is inaccurate for any special period. There is no excuse for naval plants to ignore both depreciation, and its counterpart, "renewals and replacements," and at the same time to refer to the "costs" of our work! What advantage do we reap in deceiving ourselves in the matter?

But, aside from the fact that we record erroneous costs if we fail to take depreciation into account, is there any positive advantage to be gained by including that element in our cost ac-

counts? That is to say, is it a practical problem or merely a theoretical nicety?

As a matter of fact, it is not only a common sense, practical thing to absorb depreciation into our costs; it is also a direct advantage in the interests of economy. Further, it is practically impossible to reap any lasting results from the application of cost accounting to naval industrial work, if the element of depreciation be eliminated. The explanation of this is as follows:

Our navy yards are now being placed on a standard basis of accounts, especial care having been given to the arrangement and subdivision of the "expense" accounts. By "expense" accounts are meant the records of those expenditures which are classed as "overhead" or "indirect." Assume that this standardization has been satisfactorily completed, and all yards are running on a similar basis. Depreciation is not, however, considered. The first effect of this standardization is to produce a certain economy, since each yard, being in competition (more or less complete and fair) with the others, and also anxious to better its own past performances, trims expenses as much as possible in order to reduce the percentage of "indirect charges." It soon becomes apparent, however, that the yards which have the newest and best machinery, best buildings and plant equipment generally, have a decided advantage over the more poorly equipped yards. Machinery, buildings and equipment being new and of good quality, fewer minor repairs and adjustments are necessary. The yards having poor equipment find that all sorts of minor repairs are required, thus swelling their expense accounts. Furthermore, the better equipment does better work, thus reducing costs all along the line. Nor is this all. The poorly equipped yards find it necessary to spend larger sums in major repairs and renewals. Although these expenditures do not affect the expense account nor the recorded costs of production, they eat heavily into the allotments of funds.

In order to reduce the apparent "indirect charges," all yards now find it advantageous to consider, as far as possible, most necessary repairs as being "renewals and replacements" instead of "shop" or "general expense." It is obvious that such practice vitiates the worth of the expense account records. Yet it is practically impossible to prevent it, in the absence of the depreciа-

tion element. With this element properly accounted for, the difficulty disappears, as will be shown later.

The most grievous result of this improper accounting (ignoring depreciation), is as follows: As has been said, poorly equipped plants are at a disadvantage in the comparison of expense accounts as now made up. The natural result is each plant is eager to purchase and install new equipment. There is no check whatever on the procuring of new machines, etc., save that found in the question of available funds.

If the funds can be secured from the Department, each plant is inclined to procure newer and better tools. Frequently special appropriations are passed by Congress for that purpose. Usually the new tools are put to good use. But the need for such new tools is merely a matter of opinion. No one is able to state whether it would be better business for the government to continue using the old tools a little longer. The converse of this is equally true. When new tools are actually needed, it is still a matter of opinion whether or not they should be procured. Thus large wastes are produced, on the one hand by the unnecessary purchasing of new and discarding of old equipment, and on the other hand (though much less frequently) by using old equipment at a loss which might be averted by the installation of better tools.

THE PRACTICAL BENEFITS OF INCLUDING DEPRECIATION IN THE ACCOUNTING SYSTEM.

By including the element of depreciation in our cost accounts we would obviate many of the difficulties just mentioned. The question of whether or not new machinery should be installed would be settled in a more scientific and practical manner than at present. Assume, for the moment, that Congress has authorized the establishment of depreciation reserve funds at each yard. Each year a sum is placed to the credit of this fund, being calculated by multiplying the value of each class of plant and equipment by the depreciation rate of that class. The summation of these results giving the total estimated depreciation for the year. If the plant is a "going concern," neither old nor new, the amount so placed in the depreciation fund is a fair measure of the amount which ought to be spent in renewals and replacements during the same period, in order to maintain the plant at full

value. Of course this is not the exact amount to be spent, taking any one year alone. But over a number of years, carrying balances forward, and assuming that the depreciation rates were carefully fixed, a very just estimate of the amounts properly to be spent for renewals and replacements is obtained.

Again, take the case of two plants, one with generous and the other with indifferent equipment. We have seen that where depreciation is not taken account of, the well-equipped plant has an immense advantage in calculating its expense account. But the inclusion of the element of depreciation changes this situation considerably. The plant with the expensive machinery, and with a great deal of it, also has a heavy depreciation charged up to it. The plant with lower valued machinery, and not much of it, has much less depreciation to contend with. Conditions immediately become more fair, and comparisons of cost of work begin to mean something. The plant with the poorer equipment is not induced to rush into the purchasing of new machinery until it has ascertained whether the lower cost of operation by reason of new equipment is, or is not, offset by the additional amount of depreciation to be charged against its product. This is certainly the most fair and sensible view to take of the question of purchasing new equipment. That is—is it cheaper in the long run? Other considerations have to be taken into account, of course, such as increased speed of production of new equipment, desirable for military reasons, though costing more. But bearing in mind our definition of true economy, we arrive at the same result.

Again, the tendency, which has been mentioned, to charge against the "renewal and replacement" account expenditures properly to be classed as "expense" items, is practically overcome. All expenditures for "renewals and replacements" must be made from the "Depreciation Reserve Fund." Close scrutiny must always be given to expenditures from that fund. Any unwarranted expenditures, such as items properly belonging in the "expense" account would merely cramp the fund for its legitimate purposes, and be decidedly unwise, from the viewpoint of the plant itself. Thus would the temptation to reduce expenses in that way be forestalled.

Trusting that the advantages of including depreciation in our accounting system have been made clear, let us examine further some of the alleged disadvantages.

WOULD THE INCLUSION OF DEPRECIATION IN NAVAL COSTS MAKE THEM EXCESSIVELY HIGH?

Those with whom the writer has discussed this question of depreciation in cost accounts have usually brought one argument to bear against the proposition which has been extremely difficult to refute. It is this. Our navy yards contain shops, machinery and equipment designed to turn out an amount of work in a given period, which may be called the normal output. Conditions rarely permit this amount of work being done for any continuous time. Consequently, the plants are usually running much below normal in regard to output. Were the depreciation charges of the plant, designed for a large output, entirely located to the cost of production during long periods of low output the resultant cost accounts would be practically worthless, since the depreciation element in such costs would be excessively high. Thus all hoped for advantages to be gained through comparison with commercial costs would fail to be realized. How can this difficulty be obviated? First, let us examine the situation as found in private plants. Here, we find that the depreciation element in costs is based upon the normal output of the plant, and fluctuates but little with variation of output. Should it happen that the plant is compelled to run for a long period below normal output, it would be impossible for it to raise costs of individual articles sufficiently to absorb the entire plant depreciation. It would be unable to market its product at all, if that were done—assuming that our typical plant is running in competition with others. What the plant actually does is to charge the unabsorbed depreciation up against "Profit and Loss." This question is discussed more fully under "Manufacturing in Navy Yards." The point to be observed here is that only the normal depreciation should be charged to current production. If the naval plant is running with low output, part of the depreciation should not be absorbed in the cost of production, but otherwise accounted for. The exact method by which this unabsorbed depreciation can be handled will be described under "Profit and Loss" account.

To adopt this system the following calculations would be necessary which will be described as though already in effect. The depreciation charged to any work in a given plant depends upon the shop or shops in which the work is done. Different shops of the same plant of course have differing depreciation rates, de-

pending upon the quality and quantity of machinery and other equipment in use. The value of all machinery, equipment and buildings for a given shop having been ascertained, and depreciation rates fixed, the depreciation of that shop for a month will be a certain fixed amount. The normal output of that shop is decided upon. To measure this output we use the "productive labor" which is the basis upon which our expense proratings are made. It must be definitely decided just what is the normal productive labor in each shop. This must not be the maximum productive labor possible, but a fair estimate of the amount which would be thus expended were the shop running under a comfortably full complement—not overcrowded. The total monthly depreciation chargeable to a shop, divided by the normal productive labor, then gives the percentage of depreciation to be thereafter added to each dollar of productive labor in that shop. It matters not whether the shop runs full or partially full, the depreciation charge for a given job is now the same. The depreciation not charged to cost of work (in case the shop is running below normal) is carried to the "Profit and Loss" account exactly as in the case of a well-organized private plant. How it is handled there will be described under that heading.

The above described system will prevent any undue charges from the introduction of depreciation in naval cost accounting. It is of course merely approximate in its working. It may, perhaps, be claimed, that unreliable results will be obtained, due to this approximation; that is to say, the fixing of the normal output of a shop might be so erroneous as to prevent true data being furnished in subsequent operations. For example, if the normal productive labor were fixed at too high a figure, the shop would probably run continuously with an output seemingly below normal, and therefore the depreciation which rightly should be distributed entirely to the cost of work (the shop being actually in a normal condition, though erroneously rated below normal) would only be partly so distributed, thus giving erroneous costs. The answer to this argument will be found in the fact that the temptation on the part of those interested in the shop to rate its output too high will not be so great as might at first be supposed. If that is done, it will merely result in a continuous loss in the "Profit and Loss" account being charged to that shop, on ac-

count of unabsorbed depreciation. This will be more fully understood after the description of that account has been read.

There remains to be considered the fact that Congress has not authorized "Depreciation Reserve Funds" and that such authorization is necessary before such funds can be established.

Although the ordinary commercial method is to handle the question of depreciation through the establishments of these funds, it is quite possible, in the naval service, to treat the problem differently, by opening "Depreciation Reserve Accounts." It should be understood that in accounting parlance, a "fund" is a sum of money set aside for certain purposes, while an "account" is merely a record of a series of transactions. The depreciation problem, if merely handled through reserve "accounts" will not call for the setting aside of sums of money, and therefore will not require Congressional authority.

Just how the "Depreciation Reserve Account" can be installed and operated it is not thought necessary to describe, as it is not essential for the purposes of this essay. The method has, however, been worked out in detail.

It is to be earnestly hoped that Congress will direct the establishment of proper depreciation funds at the several yards, in order that the system may be modeled after commercial methods, and thus handled without the numerous difficulties which will result from the necessity of departing therefrom.

INSURANCE

While the government does not insure its property, it does suffer losses by fire, just as a commercial organization would which did not insure. Insurance, in the long run, merely has the effect of spreading fire losses evenly over a long period, instead of paying for such losses as they occur.

The probability of fire among the different classes of property has been carefully worked out, on which basis the insurance companies make their rates. Such rates include, of course, all the necessary expenses and profit of maintaining insurance companies. Since the probability of loss by fire for each class of property is known, it would be a good idea for the navy to establish a fire insurance fund of its own, in the same manner as that urged for a depreciation fund. To the cost of maintaining all kinds of property should be added an item for insurance, at rates less than the

ordinary commercial rates for the same classes of property, since no company charges are included. The appropriations paying the cost of maintaining the property, either through the cost of work accounts, or directly in the case of military maintenance, would also pay this insurance item. In that way the fund would be established. As buildings burn at our various yards, the cost of replacement would then come from the insurance fund. Where a larger and better building was put in place of the old one, only the value of the old building could be taken from the insurance fund. The difference must be separately appropriated for as it would be an addition to capital value.

The arguments in favor of this are exactly the same as for the establishment of a depreciation fund. Fire loss is after all nothing but depreciation through fire.

In the absence of Congressional authority for the establishment of such a fund, an "Insurance Reserve Account" can be set up and made to answer the purpose, just as in the case of "Depreciation Reserve Account."

PROPOSED LEGISLATION.

The necessity for including depreciation and insurance (which is but a form of depreciation in our case) in our accounting system has been set forth. In order to accomplish this the following legislation is proposed:

From and after July 1, 1911, the accounts of all naval industrial plants shall include charges for depreciation and internal insurance against loss by fire, in accordance with accepted methods of accounting. Reserve funds shall be established for this purpose, to which the annual estimated depreciation and insurance of naval property shall be added and from which actual replacements and renewals of property shall be deducted. And for the establishment of such reserve funds, the "Naval Supply Fund" amounting to $2,700,000.00 is hereby made available.

The writer can only state that some such legislation is essential for proper accounting in the naval service, and he suggests reference to any firm of expert accountants for corroboration.

ESTIMATING AT NAVY YARDS.

Before work is undertaken at a navy yard, an estimate of its probable cost is made. If the work is of importance, such estimate must be approved by the Bureau under whose control the funds about to be expended lie. In general, all estimates are so

acted upon, since the jobs of smaller importance are really parts of larger jobs, or the work contemplated is of a routine character, for which a general approval has at sometime been given.

The preparation of estimates is not given that attention which from its importance it really deserves. This is mainly because the work being mostly of a repair nature, it is difficult to estimate very accurately what it will cost. It is very seldom that any given job is precisely similar to a preceeding job. Furthermore, as the work proceeds, unexpected difficulties are apt to crop up, the cost of overcoming which has not been included in the estimate. A private plant doing repair work has exactly the same difficulties to contend with. In its case, however, the estimate made in advance is of greater importance, since it forms the basis on which the bids for the work were made. If the work actually costs more than was anticipated, a loss to the plant must be charged up. If it costs less, a greater profit accrues. Thus a powerful stimulus is furnished towards accurate estimating, which is not at present to be found in government practice.

It is believed that if a similar stimulus existed for navy yards estimating, there would be very marked improvement shown. And an improvement in the accuracy of estimates would be of tremendous advantages to the various Bureaus who have to pass upon the question of authorizing proposed work. At present, authority is sometimes given for work to be done at a certain proposed cost. That estimate of cost is perhaps the determining factor in the decision as to whether the work should or should not be undertaken. The work is carried to completion, and the resultant cost is found to be far in excess of the estimate. Had the estimate been more accurate the work would probably never have been authorized, and some other more important work would have been undertaken, which now lack of funds prohibits.

The estimate given by a yard for doing a piece of work is equivalent to the bid of a private firm. The writer would like to see a system adopted by which the navy yard's plant is held to its estimate, so that the cost to the Bureau concerned is exactly that estimated (that is, the bids). Such would not be possible under our present appropriation system. But at least it is quite feasible to record the differences between estimates and performances, carrying them to a "Profit and Loss" account (see description of that account).

It is of course not to be expected that estimates should closely approximate the actual costs. But they should at least be reasonably close. Otherwise, there would be practically no use in preparing estimates at all. There is no doubt that if it were known that a careful record was to be maintained, showing the ability of the plant to work within its estimates, and that the records of the various plants would be compared in this respect, great improvement would follow. The "Profit and Loss" account would fulfil this function excellently.

It may perhaps be claimed that no good result would be obtained, since the natural tendency would be to make estimates as high as possible, in order to be sure of living within them, but it should be remembered that in that case authority would often be refused for the undertaking of many jobs which excessive estimates would render out of the question. Also, some classes of work at the various yards would be sufficiently similar to warrant comparison of estimates. Further, in many cases the cost of doing such work in private plants would be known. So that, on the whole, it is not thought that there would be much danger from "loading" of estimates.

There is one class of estimates for which the method just described is peculiarly suitable; viz., the estimates of probable costs of repairs, made by officers when surveying articles of equipage turned in from ships. The line of reasoning usually followed in such cases is this. A damaged article, which in the opinion of the surveying officer can be profitably repaired for future use, is known to be worth, when new, a certain amount. It is considered that after the necessary repairs have been made, the article will then have a value which depends upon its probable degree of fitness. For example, if the repairs will make the article as good as new, the final value after being repaired should be the same as the original value. If the repairs are expected to render the article useful, but not as good as new, the final value should be less than the original value. The surveying officer, after deciding what the repairs would cost (obtaining estimates from the shop or shops where the work is to be done), appraises the article at a price, which, with the estimated cost of repairs added, will bring it up to what he considers will be the correct value after the repairs have been made.

The repairs are made upon the articles. If the cost of such

repairs agrees with the estimate, the article is turned into store at a proper invoice value. In most cases, however, the actual cost of repairs differs widely from the estimated cost. Frequently the difference is so greatly in excess as to cause an absurd valuation of the article, and steps are then necessary to readjust such valuation. In the majority of cases the result is not happy, and repaired articles are apt to be invoiced at prices which do not at all represent their value.

In the place of this system it is recommended that surveying officers fix the present appraised value of the article, and at the same time the final invoice value which it shall have after repairs. The difference will, of course, represent the estimated cost of repairs. No matter what the repairs actually cost, the article should be invoiced at the value fixed by the surveying officer. But the difference between the estimated cost and the actual cost should be carried to the "Profit and Loss" account.

Such a method would prevent improper invoice values of repaired articles, and would immensely simplify what is at present often a difficult and vexatious problem in accounting. At the same time excess costs of repairs would be sharply drawn to the attention of those interested in the expenditure of funds under the various appropriations.

This question of estimating is a big one, and the writer does not intend here to go into the problems concerned with the manner of making estimates. There are many who believe that it is practically impossible to make any great improvement in the accuracy with which the probable cost of naval repair work can be foretold, placing their opinions on the ground that no two jobs are sufficiently alike to warrant the expectation that past performances can be duplicated in future work. They also point to the fact that it is the unexpected element which so frequently renders final cost disproportionate to the estimate, as for example, when a boiler, whose condition must be judged from the outside only, is opened up for repairs and found to be in a much worse state than was anticipated.

The writer believes that a close study of this subject will prove that while practically all repairs differ when considered *in toto*, yet there is some uniformity in the various operations which go to make up various classes of completed work, and that these operations can be to a certain extent classified. Estimates based

upon a series of operations, each of which has a probable cost fixed by experience, should then be more accurate than merely considering the proposed job as a whole. Unexpected elements which present themselves during the course of the work could be segregated and reported as causing the difference between estimated and actual cost. If in the judgment of those authorizing the work this unexpected element is one which could not reasonably have been foreseen, an increase in the estimated amount might be permitted, just as in dealing with a private contractor we sometimes allow an increase in the price to be paid on reasonable grounds. Otherwise the difference must be recorded as a loss in the "Profit and Loss" account.

MANUFACTURING IN NAVY YARDS.

It is usually considered inadvisable to carry the business of manufacturing articles in navy yards any further than is absolutely necessary for the needs of the moment.

With the exception of certain articles, such as cordage, chain and anchors, boats and their outfits, flags, and in general, articles which are either not obtainable commercially in just the form or quality wanted for naval service, or for which custom has established the practice of navy yard production, the Department discourages manufacturing. The reasons for this are (1) the danger of producing large quantities of articles through the temptation of keeping men employed, thus overstocking heavily; (2) the high cost of government manufactured articles, due to the fact that navy plants are not usually equipped to turn out articles as cheaply as private firms, which specialize in them; (3) the plants are primarily repair plants, and manufacturing might interfere with this more legitimate object; (4) the opposition towards competing unnecessarily with private plants. For these reasons, it is sometimes urged that navy yard plants be prohibited entirely from manufacturing articles. It undoubtedly is true that the first two reasons are the more important, and that if they were rendered non-existent, the others could be disposed of. Considering the first two reasons only then, it is desirable to take up this subject from a different, and it is believed, new point of view.

In a properly organized government plant, the manufacture of articles for stock will be controlled absolutely by the average demand for those articles for use. While it may be admitted that

in a navy yard, run on indefinite lines, without centralization of authority, and without adequate conception of the evil results following unnecessary manufacturing, overstocking will occur; yet, in a well-administered plant, in which the final effect of errors of this kind are well understood, it is certain that no such danger will exist. It might as well be claimed that excess stock is bound to accumulate through purchasing in the open market. Yet it is well known that in recent years improved methods of administration and accounting have reduced this danger to a minimum. As a matter of fact, overstocking has occurred in the past from both manufacturing and purchasing. It has been practically cured in the latter case, and it can be in the former. It is granted at once that under present navy yard methods, manufacturing is a danger. But having improved the general conduct of business in navy yards to the required point, the danger disappears, and manufacturing may be carried on without fear of overstocking, provided it is for other reasons desirable.

We have seen that a navy yard plant, owing to the varying demands made upon it for repair work, fluctuates in activity over a wide range. The equipment must be sufficient to meet maximum demands. In slack periods there is consequently a constant expense going on, due to the upkeep of plant, care of buildings and machinery, and depreciation. This expense is almost, if not quite as heavy as when the plant is fully operated. Furthermore, although there is really not sufficient work for them, many men are kept on the rolls, pending the time when their services will again be urgently needed. Many employees are, of course, discharged at this time. But others must necessarily be retained, as it would be impossible to get hold of them or others equal to them immediately when the rush of work comes. This may be classed as a military necessity, since the yard must be ready to do repair work on demand. The condition, however, is also found in commercial plants. Hence, such plants are constantly hunting for work, not only for the profit to be obtained, but to keep their men and plants employed, until better conditions occur. Thus, in slack times work is often taken and the product sold at prices which show a book loss. But the loss is less than would have occurred had no work of the kind been done. Depreciation and general expense had to go on anyway. Deduct those items from the cost of production of the work referred to, and a profit is shown on the transaction.

In the same way, our navy yard plants and employees, when work is slack, should be utilized if possible. Assume, for purposes of argument, that a list of articles used in the naval service can be prepared, of such a nature that the same plant equipment and workmen employed in repairing ships can also be employed in the manufacture of those articles, when there is but little reparing to be done.

These articles must, for their production, require the usual classes of labor common in navy yards. They must be such that it is economical to carry a fair stock, that is, the demand for them in the service must be constant. They must also be obtainable commercially when needed, since occasions might demand the entire cessation of their manufacture in the yards during long continued repair work. It would then be necessary to procure these articles in the open market.

Having, after careful study and investigation of the facilities for manufacture in every plant, assigned to each a list of articles to be manufactured, of the characteristics described above, we would then be able to offset in some degree the fluctuations of work of a repair nature only. This plan would only be used as an adjunct to that recently put into force by the Department, by which ships go to a yard for general overhauling in rotation, thus distributing the work more evenly than has hitherto been the case. Considering repair work only, there will always be periods of full and slack times in navy yards, as it is impossible to lay down any exact routine for work of this nature, many repairs being necessitated by casualties, attention to which cannot be delayed. The manufacturing program as outlined can be made to partially, if not completely fill in the gaps, if carefully designed and adhered to. It is important that in assigning articles to be manufactured at the several yards. a division be made, so that each yard may manufacture only certain things, instead of all yards manufacturing all the articles on the list. Or to put this in another way, any articles on the list should be manufactured at one yard only. That yard, by frequent repetitions of the process, will be able to bring the cost of production of the article to a much lower point than would be possible if the necessary supply were produced at all yards. This is in reference to stock articles, and does not apply to special appliances which are only manufactured occasionally.

For example, the joiner shop at a certain yard can be profitably employed, when not engaged on repair work for ships, in manufacturing chests of the various kinds used in the naval service. It is found that the entire stock necessary for the navy can be manufactured in that one shop, working in what would otherwise be slack times. Do not allow that shop to manufacture a lot of other stock articles, but confine it to chests. It is evident that better and cheaper chests will be produced than if they were made at each yard, as occasion demanded. Other joiner shops in other yards will have their own specialties. Shipment of such articles from one yard to another is comparatively inexpensive, and the storehouses will be able to maintain stock easily in that way, and at the same time to control the quantity of articles produced; it being understood that each lot manufactured must be to fill a requisition for stock.

It is not pretended that this is a simple problem, or that a great deal can be accomplished in a short time. It is believed to be worthy of serious study, however, and there is no doubt that application of such a system will gradually produce invaluable results.

It is, of course, true that attention is now paid to the desirability of utilizing our shop resources, when not otherwise employed, in manufacturing articles for our own use. But the study given to it is by no means adequate to its importance. This is largely owing to the fact, to which attention has been called, that the policy of the Department is to discourage the growth of manufacturing. Such policy has been correct, inasmuch as there was no well-defined plan is existence as a safeguard to the danger of indiscriminate and excessive manufacturing. But with the adoption of such a plan, great possibilities for economies are introduced. The alert manager, finding from the monthly statements that in certain shops constant loss is going on from lack of employment, begins to search the list of articles needed in the naval service, to discover those in the manufacture of which he thinks his shops might well be employed. He selects certain ones for which his equipment is suited. He knows he cannot turn out these articles at their usual invoice price, but he also knows, and is able to prove to the Bureau interested in the furnishing of such articles, that the loss involved in manufacturing them is less than the loss going on by reason of unemployed shops. Having made good this point,

and having received authority to manufacture the articles, which must be invoiced to store at their usual market price (see "Prices of Manufactured Articles"), it now becomes a struggle to reduce the loss shown by the difference between manufacturing cost and invoice value. Here we have a definite object to be attained, and there can be no doubt that gradually the cost of production will be reduced to near the actual value.

This is but an example of what may be achieved. But, it will be asserted, such a system will be liable to abuse. Granted, but since we know it is liable to abuse, and since the whole policy proposed depends upon a system of accounts under which abuses are bound to be recorded, we can safely, under a watchful eye, permit this danger to exist.

In the ordinary repair work falling to the lot of our navy yards, there is usually not much chance to plan ahead for economies by the distribution of the work in such manner as will best suit the shops. Everything must be done in a rush, and it is not possible to know very far in advance how much work is coming, nor when. Manufacturing offers the only field for satisfactory and accurate planning. It is more on a par with ordinary commercial work, and should be extremely useful in showing to what degree of excellence our shops are from time to time arriving. This aside from the actual saving to be effected by the judicious management of manufacturing work.

PRICES OF MANUFACTURED ARTICLES.

Articles manufactured in navy yards usually carry a higher invoice value than the same articles when purchased. Where this is not so at present, it will undoubtedly be the case if all the cost elements are included in such invoice value.

If such articles are issued to the service, bearing high navy yard prices, a discrepancy results in the records of costs of repairs and costs of commission of ship. Especially is this true when articles of the same kind are purchased and issued at lower prices. Under the modern competitive system, this is likely to work serious injustice. Articles manufactured in navy yards should therefore bear prices in accordance with the real values, no matter what it has actually cost to manufacture them. If the same kinds of articles are both purchased and manufactured, the latter should be valued at the market price of the former, so that both may be issued to the service at the same price.

This is practically equivalent to the condition to be met by a private firm which has manufactured articles at a cost higher than the market value. Such a firm must sell its product at the market price, no matter what it has cost to manufacture.

To comply with this condition, all articles manufactured at navy yards for stock should have their invoice prices determined beforehand.

Such prices should agree with those of similar commercial articles, unless there is reason in certain instances to believe that the quality of navy manufactured articles is somewhat better than that of the commercial grade. Rope manufactured at Boston is a case in point. In such instances prices might be placed a little higher than the ruling market price.

There will then have to be accounted for the difference between invoice price and actual cost of manufacture. This difference should be carried to the "Profit and Loss" account (see description of that account).

A study of the amounts carried from the cost sheet of a given article, to the "Profit and Loss" account, will indicate whether or not that article is being manufactured economically. Full control of the cost of production will thus be retained, while excessive expenditures in that direction, if made, will not work injustice in the records of those who use the articles.

THE "PROFIT AND LOSS" ACCOUNT.

In a commercial enterprise the final proof of success is found in the balance shown in the "Profit and Loss" account. The results of all endeavors towards efficiency are measured here. All errors of omission or commission make themselves felt in this statement, each item of which can be analyzed in such a way as to furnish valuable information in connection with plant economy. Without such an account a private industry would be indeed helpless.

Naval plants are not run for the purpose of making profits, to be distributed in dividends, or otherwise. Or, to express the same idea in another way, the profits of private plants, which are expected to vary from large amounts in some cases to small sums in other, should, in a naval plant, be zero. Aside from this difference, such a plant has so much in common with ordinary in-

dustrial concerns that one is led to the conclusion that the absence of so vital an element as a final record of success—or non-success—must necessarily be as fatal to its efficiency as it would be to that of its commercial rivals.

What, then, can be instituted to take the place of this very essential element of commercial business? Is it not practicable to devise some record which will indicate, in our accounts, the failure or success of individual departments to achieve economies? It should surely be possible to ascertain and record the results obtained by the introduction of new machinery, or the improvements in methods, in about the same way that private plants do.

To the writer the difference in conditions between governmental and private industrial plants is more apparent than real. In fact, it is believed that such an account can be set up, which, although not exactly similar to the commercial account of the same name, will yet be so nearly like it as to be, for all practical purposes, the same.

The profits and losses of a naval plant may be described as the differences between the actual costs of certain kinds of work or expenses and the anticipated costs. The clearest case is that of the difference between the cost to manufacture an article, and the price which must be set upon it after manufacture in order to conform to the ruling invoice value. This has been dwelt upon under the heading of "Manufacture in Navy Yards." If the plan of invoicing all manufactured articles at what is considered their value, be adopted, then, if it actually costs less than this value to produce the article, the difference may clearly be set down as a profit to the plant. If it costs more to manufacture than such invoice value, the difference should just as clearly be recorded as a loss.

By entering in our "Profit and Loss" account the figures thus pertaining to each article or class of articles manufactured, we would have a most valuable record of our plant's ability to successfully manufacture the articles concerned. At the same time attention would be immediately directed to those articles showing excessive loss, and either more economical means of production would have to be devised, or the manufacture of such articles discontinued.

The next class of entries to be considered are those arising from the differences between estimated costs of repairs and final

costs, also between estimated and final costs of manufacturing special articles not having fixed invoice value. The two classes practically form one problem. Here the differences are not so absolute in their nature. The errors may be entirely due to mistakes in estimating. Nevertheless it would be of great value to get such errors so located as to indicate whether they are usually all one way or the other. The classification of these errors or differences by departments and shops would also be of great assistance in determining where indifferent estimating or excess costs arose. As stated under the head of "estimating" it is believed that much improvement is possible in that particular, and the bringing out into relief of the "high spots" would necessarily be the first step in the right direction. Certainly comparisons could be instituted between various yards as to their ability to work within their estimates for all classes of work, and the worst offenders could speedily be taught to profit by the methods of their more skilled brethren, which is after all one of the prime advantages of our industrial combination of different yards.

The question of depreciation in shops running below normal output was discussed under the head of "Depreciation in Naval Plants." The "Profit and Loss" account, by showing such a condition in succeeding monthly statements would lay stress upon it, and render it imperative to adopt curative methods either by securing additional work, or, if thought best, reducing the equipment of the shop to a proper basis. This question was also touched upon in the section relating to manufacturing.

The "shop expense" of the various shops, covering the items of expenditure necessary to maintain them in running condition (except replacements and renewals for which sufficient depreciation is allowed), is in naval practice usually fixed upon a basis of a percentage of the direct labor employed. At the end of each month this percentage of direct labor in any given shop will, of course, either be less than or exceed the actual running expenses of the shop. The differences should be carried to the "Profit and Loss" account for each shop concerned.

To recapitulate, the following should be some of the entries made in this account: (1) The under absorbed depreciation, if any, as described under that heading; (2) the under or over absorbed "shop" and "general" expense; (3) the difference

between invoice value and actual manufacturing cost of articles manufactured; (4) the difference between invoice value and actual cost of articles repaired; (5) the difference between the estimated cost of work on ships and the actual cost; (6) the difference between the estimated cost of other classes of work and actual cost.

The entries made in this account under items (1) and (2) would indicate whether or not a shop were running continuously below normal output. Should this be found to be the case, it would then be evident that better oversight is needed in procuring work for that shop; or that its normal output has been rated too high, and should be reduced, in order that depreciation charges may be more fully absorbed; or that the shop has more facilities than is needed, and its equipment should be reduced.

Under item (3) the entries would indicate whether or not articles were being manufactured at a loss. If at a loss, the details of cost should be investigated, in order to ascertain whether or not the manufacture of the articles in question should be continued, taking into consideration the point made under "Manufacturing at Navy Yards" that it is often true economy to produce temporarily at a loss, rather than have the plant lie idle.

Under items (4), (5) and (6) would be shown the ability of the plant to work within its estimates. It would be of immense value, from the viewpoint of the Bureaus of the Department, to have each plant struggling to keep within its estimates, in order to prevent the showing up of errors, either of estimating or carrying out of work; and "Profit and Loss" account would fulfil this function admirably.

There would be many other items to be carried to this account, not possible to enumerate here. When finally made up each month, this account would show, in as much detail as may be desired, the final efficiency for that month. In no other way is it possible to justly criticize the work of a plant. No matter how efficiently the managers of a plant may think they have conducted it, unless they have some means of taking into account all the elements of expenditure, and to set off all losses suffered against all gains made, they cannot really know whether the net results have been good or bad. Mere opinions in regard to

specific improvements inaugurated cannot be accepted until the whole story is known, and the details fully set forth. A standard to measure by is essential and the proposed "Profit and Loss" account will fulfil the requirement.

It is not assumed that such an account will be absolutely accurate, especially when first set up. But there is no question that, after experience has modified its essential elements, it will prove invaluable as an aid to intelligent dissection of the months' work.

This account, taken in conjunction with the plant "balance sheet" will tell the tale of plant efficiency (or non-efficiency) unerringly to those educated to its importance.

Having struck our balance at the end of the month in the "Profit and Loss" account, it must needs be disposed of. Under our present appropriation system this can best be done by prorating the balance among the leading annual appropriations in accordance with the amount of direct labor applied for each Bureau concerned. If it is a loss, each of the appropriations referred to must contribute for the month more than its work cost. If a gain, such appropriations will pay less than the calculated value of its work.

If the one general appropriation system, as described herein, should be adopted, the loss or gain would affect its expenditures only, thus simplifying this particular problem. Specific appropriations should always be charged exactly what the work costs.

The above is not intended as more than a general description of the account and its workings. Being new, the details would necessarily develop after the plan was undertaken.

As already stated, the writer regards such an account as the key to any successful system of navy yard accounting. Without it, mere opinion only must be depended on to advance ideas of efficiency, and no proofs can be adduced to support such opinions which will bear close analysis.

The ideal condition of navy yard economy would be arrived at when the total net balance in the "Profit and Loss" account, in favor of the plant, exactly equalled the amount which was paid during the same period to the laboring force in the shape of leave, holiday and disability pay. This would be equivalent to an exact distribution of earnings in dividends, regarding the workmen as the only stockholders.

THE GENERAL ACCOUNTS OF THE PLANT.

Having properly "Capitalized" our plants, the next step is to open and maintain books of record and accounts which will at all times show our financial standing. At present we do not really keep books at our navy yards, in the accepted sense. We merely record data in order to make reports to the Navy Department. This is true of Boston, New York, etc., where the new systems have been installed, as well as at the other yards, since the general books, although opened, have not been actually utilized, and the reports still continue.

What is needed most of all is decentralization from the Navy Department. All the elaborate reports now transmitted to the Bureaus should be discontinued, and each yard should be required to maintain a thoroughly up-to-date bookkeeping system of its own. Balance sheets, and certain detailed reports when required, would give the Bureaus all the needed information to keep in touch with the yard work. These balance sheets, combined into one grand statement at the end of the fiscal year would give the figures necessary to be transmitted to Congress. A vast waste of clerical labor would thus be avoided.

Under the heading of "Administrative Methods" the writer has indicated his views as to the duties of the inspectors. If those views were carried out, the great mass of figures transmitted monthly to the Bureaus would be unnecessary. The inspectors, being on the spot, could correct all those mistakes the occurrence of which the Bureaus now claim renders the detailed reports essential.

All exceptional points would, of course, be reported to the Bureaus, such as excessive costs of certain jobs, etc. To these the Bureaus could give that attention which is hardly possible when a mass of data, most of which needs no remark, has to be considered.

Besides all this, by decentralizing, and placing the responsibility for keeping affairs straight on the yards themselves, the officers at the yards would necessarily become more familiar with the effect of various kinds of expenditures which now once reported are soon forgotten. Thus a sort of watchful care on the part of those at the yard would be instituted, not now possible while the main responsibility rests on the Bureaus.

APPROPRIATIONS.

Under the heading of "The Difficulties in the Way of Economy" reference was made to the complicated appropriation system under which we obtain the funds necessary for carrying on our industrial work. Various recommendations have been made in the past for the simplification of this system, which, had they been adopted, would have improved matters a great deal. Nevertheless no plans which the writer has seen have in his opinion quite furnished a satisfactory solution of the difficult problem involved. It is not entirely a simplification or condensation of appropriations which is wanted, but rather a change in method quite outside these desirable attributes, to be utilized, however, in connection with them.

Our present appropriation system is, of course, the outgrowth of years. Old customs and ancient methods are mirrored in their verbiage, and there might perhaps be some sentimental and historical reasons to be urged in favor of perpetuating their quaint and picturesque turns of expression. But as a matter of practical administration it is unwise to continue this time-worn custom.

Our appropriations, so far as they affect our industrial operations, are (1) specific appropriations, and (2) annual appropriations. The specific appropriations are those granted for some definite purpose such as the amounts allowed for various public works, and the increase of the navy appropriations. The amounts so authorized are usually expendable exactly within the terms of the law, and cause little or no difficulty. The discussion which follows will not relate to them at all, or only to a slight extent.

The leading annual appropriations are those under which the greater part of our industrial work is done. They are "Construction and Repair," "Steam Machinery," "Ordnance and Ordnance Stores," "Equipment of Vessels," "Maintenance Yards and Docks" and "Repairs and Preservation at Navy Yards." Whenever one of the appropriations named is referred to, the fiscal year to which it pertains is appended, since each of these appropriations is available only for the purpose of the year for which it is granted.

All of these annual appropriations (except one), specify in detail some of the purposes which they are intended to cover, and at the same time each has one or more general clauses which enable it to be used for almost any purpose, or at least for any

purpose which common sense would prescribe as properly within the purview of the Bureau which has cognizance over it. Thus "Construction and Repair" has the following: ". . . . general care, increase and protection of the navy in the line of construction and repair." Steam machinery has "For completion, repairing and preservation of machinery and boilers of naval vessels, including cost of new boilers; . . . ."

"Ordnance and Ordnance Stores" has "For providing, producing, preserving and handling ordnance material; . . . ." Then comes "Equipment of Vessels," which, after mentioning several things, has ". . . . and for the purchase of all *other* articles of equipment at home and abroad, and for the payment of labor in equipping vessels and manufacture of equipment articles in the several navy yards." If the word "other" were eliminated, none of the articles need have been mentioned. "Maintenance Yards and Docks" states at once that it is "For general maintenance of yards and docks . . . ." and then proceeds to state what those maintenance charges are. The one exception is "Repairs and Preservations at Navy Yards," which has no explanatory data, and is therefore to be taken at face value.

Until recently, as is well known, there were at each navy yard five working departments, representing five Bureaus of the Navy Department. The appropriations just named were utilized by the Bureaus concerned to carry on the larger part of their activities in the various yards, the Bureau of Yards and Docks having two (last named). It will be readily seen that the general clauses of these appropriations actually cover their intents and the addition of other language, *not prohibitory* in any sense, but merely in further description of the characteristic expenditures to be charged against them, do not in any way limit their functions. That is to say, the words "such as" are always to be understood as preceding the detailed list of objects named. Such has always been the tacit understanding of the Navy Department, although not always directly expressed. In pursuance of this construction, each working department in the navy yards used the funds of the general annual appropriation allotted to it for all necessary purposes, whether specifically mentioned by the appropriation or not, the general clause always being fallen back on when required. This led to a curious arrangement, or understanding, which was never fully analyzed by those concerned. The Department of

Yards and Docks, expending the two appropriations which, by their terms, covered the ordinary maintenance and repair items of the yard, was usually furnished with insufficient funds for that purpose, owing to the fact that the amounts appropriated were too small. Consequently the money of those appropriations was restricted, as far as possible, though not entirely, to the items actually mentioned under "Maintenance Yards and Docks," the general clause not being drawn upon. But there was not even enough money for the items specifically named, taking the entire yard in consideration. Consequently the other appropriations "helped out" to a large extent, in the payment of running expenses, which their general clauses made entirely practicable, the aid of each being confined, however, to its own particular department.

This method worked well enough as long as the five separate departments continued in existence. But when the yards were reorganized, combining these departments into one, and finally into two, trouble was experienced. The several appropriations in many instances provide for the same class of expenditures. As long as the old departmental boundaries existed, each appropriation was drawn upon for expenditures within its own department, and there was not apt to be a question as to which appropriation should meet any general expense capable of being met by all. It was settled by the department in which the expense arose. But with the removal of these departmental boundaries, that convenient method of arranging the matter disappeared. Compromise was resorted to, and the introduction of new cost accounting methods providing for a prorating of expenses among the appropriations, aided towards a partial solution of the problem. This latter element, however, brought new difficulties to be contended with. The aim of a cost accounting system being to ascertain as nearly as practicable the true cost of production, it was, of course, desirable to include in such cost all those expenses commonly classed as "overhead" or "indirect." The two yards and docks appropriations are by their very nature of this overhead character, so far as they pertain to the industrial yard. Here we have a difficulty which renders the obtaining of true costs quite complex. On one hand is an appropriation which provides for the producing of a certain article, the cost of which, properly

calculated, includes a fair proportion of the overhead charges of the establishment producing it. At the same time we have another appropriation which provides for the payment of a part of the overhead charges. If such part of the overhead charges is paid by the second appropriation, the article produced necessarily has its cost only partly charged to the first appropriation, and the second appropriation pays the balance. These two appropriations together pay for an article which one appropriation only was intended to be expended for.

The truth of the matter is that separate appropriations for the upkeep (maintenance and repair) of an industrial plant are confusing and unnecessary. Such expenditures are properly a part of the cost of production chargeable to the appropriations specified by law to bear the costs of production—meaning, by production, repairs to ships, as well as manufacture of articles. Maintenance appropriations are, of course, necessary for the military section of the yard, but they should be confined to that section.

From the foregoing it must be evident that the system of specifying in extreme detail just what a general appropriation is to be used for, and then throwing in one or two clauses which permit the use of the appropriation for any expenditure coming under the purview of the Bureau concerned, has its objections. No actual restriction is placed upon the use of the appropriation, but a lot of useless verbiage is included which sometimes leads to difficulties, as when two or more appropriations specify the same thing, not infrequently the case. Thus "Construction and Repair," "Steam Machinery," and "Equipment of Vessels" all authorize the purchase of machine tools. "Ordnance and Ordnance Stores" does not, yet the last named appropriation has frequently purchased machine tools under its general clause. Since the consolidation of departments in yards it is often an embarrassing question to decide which of these appropriations shall pay for a needed tool.

Perhaps the best example of this wrong system is found in the restrictions placed in each of the leading general annual appropriations relative to employment of clerical and drafting force. Each mentions a limiting amount which may be used for that purpose, the proviso having been first inserted when there were the separate working departments for each appropriation, at

which time the limitations were inserted to prevent the employment of undue clerical and drafting forces in those departments. At present, however, the clerical and drafting forces are distributed without regard to those appropriations, conditions having absolutely changed. The result is that there is no more reason for paying any individual from one appropriation than from another. Consequently the limiting amounts are in effect lumped, a new appointee going to the appropriation which has the most money available for that purpose.

A simple proviso in one appropriation limiting the total amount to be employed in navy yards for clerical and drafting force would be much more business like.

In any event it is clear that appropriations which meet the conditions of a five-department yard will not be suitable for a two-department yard.

In place of these general appropriations the following is recommended, the amount being based on the current appropriations.

REPAIRS AND MAINTENANCE, NAVY, 1911.

Labor, material and incidental expenses necessary for repairing and maintaining naval vessels of all kinds, and for the manufacture or purchase of all supplies and equipage not otherwise specifically provided for, and to offset depreciation of naval industrial plants, twenty-five million dollars.

Then would follow such restrictive legislation as Congress now inserts in the leading annual appropriations. The above appropriation would take the place of—

Ordnance and Ordnance Stores	$ 5,425,000.00
Repairs, Ordnance	30,000.00
Miscellaneous, Ordnance	9,000.00
Equipment of Vessels	3,843,300.00
Contingent Equipment	100,000.00
Construction and Repair	8,979,144.00
Steam Machinery	6,256,000.00
Handling Stores (deducted from Provisions, Navy)	447,556.00
	$25,000,000.00

The estimates on which this appropriation should be based are shown in the following section of this essay.

Separately should come the following appropriation:

MAINTENANCE MILITARY YARDS.

Maintenance, repairs, and preservation of the military portions of navy yards and stations, and all necessary appurtenances, two millions and twenty thousand dollars.

This is made up of

Maintenance Yards and Docks	$1,290,000.00
Contingent Yards and Docks	30,000.00
Repairs and Preservation at Navy Yards	705,000.00
	$2,020,000.00

Let us examine into the effect of this system of appropriating.

In the first place, every expenditure now possible under the separate appropriations of either group would be possible under the consolidated appropriations substituted. Considering the first group only, it will be seen that all the varied language of the separate appropriations (which it is not deemed necessary to quote) does not make the situation any clearer as to what the money is to be used for than does the language of the consolidated appropriations. It is impossible to give an idea of the scope of an appropriation by naming a few more or less insignificant items. The fact that the money is to be used for certain distinct purposes, clearly specified, is all that can be expected or desired.

What disadvantage would there be to the separate Bureaus in having their leading annual appropriations consolidated as shown? It will doubtless be claimed that the Bureaus would be at a loss to determine their authority over the available money, and hence could not proceed securely in the prosecution of their work. The answer to this is that the total amount of such an appropriation would, of course, be based primarily on the estimates submitted by the Bureaus, and that after final action by Congress it would be perfectly plain to just what extent each estimate had been amended, and therefore each Bureau could start the fiscal year with an allotment of the general appropriation based on its *approved* estimates. As the year proceeded, however, it would become apparent (as it always does) that some estimates were over, and some below the actual needs. Adjustments of allotments would then result. The working Bureaus, drawing from a common fund, would be brought in closer touch with each other. Furthermore, all those questions concerning the point as to where charges to one Bureau's appropriation end and those to another

Bureau's appropriation commence would be practically done away with. Inside a turret, for example, work may be going on at present chargeable to "Construction and Repair," "Ordnance," and "Steam Machinery." It becomes a nice point sometimes to locate the charges correctly. If it were merely a question of whose allotment was concerned the question would be much simplified. A system of give and take, or a readjustment of allotments, would settle the difficulty.

Each Bureau would still maintain its authority over certain classes of work, just as at present. If necessary, the scope of each Bureau's authority could be made a matter of permanent law, instead of embodying it largely in the annual appropriation acts, as is now done. That would be a much better plan.

Is the one appropriation any looser, that is, more capable of improper use, than the separate ones? Not at all. Quite the contrary would be the case.

It should be especially noted that actual economy would result from the adoption of the plan proposed.

It frequently happens that deficiency appropriations are necessary to assist certain annual appropriations. At the same time other appropriations were close to, but within the mark. Had these appropriations merely been separate heads or estimates of the one grand appropriation, the excess of some would have been compensated for by holding up expenditures under others, and thus no deficiency appropriations would be called for. The writer has a fairly intimate knowledge of the conditions governing the control of naval appropriations, and he feels safe in saying that sometimes amounts are expended because the money is available which would not have been used for the same purposes could the money have been utilized to assist other appropriations. The result has been, however, that extra amounts have had to be called for to assist the exhausted appropriations, while, as stated, the money under the appropriations with a surplus was expended also.

The above argument only pertains to those appropriations which are of the same nature, and capable of being welded into one general appropriation as shown. It applies in no sense to specific appropriations, such as those for public works, increase of the navy, etc. These are properly segregated, being for separate and distinct purposes.

The main advantage, the overshadowing one in fact, is that such a general appropriation would permit of accurate accounting, particularly as regards cost accounts, which the present method renders extremely difficult. In fact, it has prevented the adoption of a business like, true cost accounting system. This has already been explained. To exemplify it further, note the condition which exists every day in navy yard work. Say that repairs to a vessel's boilers are underway, authorized by the Bureau of Steam Engineering. Certain hull work is required in connection with these repairs. Since such work is chargeable to the construction and repair appropriation, that Bureau's approval must be obtained before it is undertaken. When approved, a separate job order must be opened for this "assisting job," as it comes under a separate appropriation to that of the main job. Consequently the full cost of the work (even as calculated under our present defective system) is never found in one place. Usually the cost of the "assisting jobs" are lost sight of, unless they happen to be great in amount.

With the one common appropriation for such work, the above would not be the case. The job opened for the repair of the boilers would be charged with the cost of all the work done in connection with it, the hull department and the machinery department of the yard each doing the necessary work coming under its jurisdiction. The total cost would be charged to the Bureau of Steam Engineering's allotment, since it is that Bureau which authorized and supervised the work. It is difficult to convey accurately the difficulties which now arise from the necessity of keeping separate each Bureau's appropriation for general work. It is safe to say that fully half the accounting force is occupied with that problem.

The appropriation for the "Maintenance of Military Yards" needs no special explanation. The main thing is to get it separated from the industrial appropriations.

ESTIMATES FOR THE GENERAL APPROPRIATION.

The estimates to be submitted by the Bureaus concerned, on which the general appropriation recommended is to be based, should be in about the form shown in the following table:

ESTIMATES SUBMITTED.

Title charged.	Bureau of Ordnance.	Bureau of Equipment.	Bureau of Cons. & Rep.	Bureau of St. Eng.	Total.
D	$641,000	$1,200,000	$5,600,000	$3,700,000	$11,141,000
N	140,000	190,000	125,000	20,000	475,000
O	93,000	50,000	60,000	30,000	233,000
P	60,000	70,000	160,000	55,000	345,000
Leave, etc.	140,000	105,000	435,000	250,000	930,000
V	286,000	285,000	600,000	400,000	1,571,000
B, C, and Y	406,000	2,000,000	2,300,000	1,945,000	10,305,000
	$5,420,000	$3,900,000	$9,280,000	$6,400,000	$25,000,000

D = Repairs to vessels and machinery.
N = Tests and experiments.
O = Stores placed aboard naval militia ships.
P = Repairs to equipage aboard ships.
V = Incidental expenses, including unabsorbed depreciation and other unabsorbed expenses.
B = Equippage issued to ships.
Y = Supplies issued to ships.
C = Miscellaneous expenses of commission of ships.

Here we have each Bureau's estimates separately stated, and then combined into one grand estimate for each item. This supplants the estimates now rendered independently by each Bureau, for its general appropriation.

The item for "Handling Stores" which, as has been shown, is now included in "Provisions Navy" is distributed, in the above table, to the estimates of the Bureaus mentioned.

Included in the estimates under each item are the "Indirect Charges" which should properly form part of the cost of work to be done. A separate estimate of these charges should also be submitted, although no extra appropriation should be made therefor, since they are to be absorbed into the cost of work done under the general and under the specific appropriations. The general appropriation, however, carries an item of a little over $1,500,000 —see Title V—to which the *unabsorbed* expenses (this has been explained) should be charged. This item, being largely due to undesirable fluctuations in volume of work, may be expected to decrease each year, as more accurate planning of work is instituted.

The estimated "Indirect Charges" for the industrial yards of the current fiscal year would have been, under this system, similar to the following:

ESTIMATED INDIRECT CHARGES.

Maintenance of:	
Grounds	$ 180,000
Buildings	400,000
Yard Appliances	170,000
Yard Craft	300,000
Dry Docks	100,000
Fire Apparatus	20,000
Telegraph, Telephone, Etc.	60,000
Vehicles and Live Stock	100,000
Power Plant	700,000
Machinery Plant	500,000
Office Force	1,800,000
Water	100,000
Hand Tools	300,000
Handling Stores	500,000
Miscellaneous	1,000,000
Depreciation	1,200,000
Total	$7,430,000

These figures are, of course, very rough, and are merely intended to give a general idea of the method of preparation. Only after one or two years of accurate accounting could they be expected to approximate the facts. Sufficient data does not exist at present to properly prepare these figures.

The above list of expenses would be made up by combining the figures from each industrial yard.

All of the above figures should be submitted to Congress in connection with the proposed general appropriation act. The following year the actual figures, side by side with the estimates previously made, should be laid before the committees, together with such explanations of the differences as may be pertinent. This closely follows the British system of reporting expenditures.

SOME REMARKS CONCERNING ADMINISTRATIVE METHODS.

Concerning the method of administering industrial navy yards, expecially as between the one-department and the two-department systems, this article has very little to do. As elsewhere expressed, the writer's opinion is that this question is of far less importance than is that of providing a thorough and satisfactory system of financial control, based upon logical appropriations, anc built up into a business like structure, self-centered and self-con-

tained. An industrial navy yard is made up of units consisting of shops. The grouping of these shops into one, or two divisions is simply a question of administrative expediency, to be settled in accordance with the beliefs of those who have the power to enforce their opinions. Either plan will work, and work well, provided the right men are in charge, and, as before stated, a sound financial policy is in operation. Lacking one or both of these requirements, either plan will fail, ultimately.

The object of this essay being confined almost entirely to the financial end of this problem, little need be introduced regarding the personal element. There are one or two points, however, which must be touched upon.

The main effort of a navy yard plant should, of course, be directed to producing efficient results in all departments, rather than in perfecting one section at the expense of another. Thus entire cohesion and thorough understanding, a pulling together of all parts is necessary. In the present two-department organization there is bound to be a certain tendency for each department to endeavor to excel the other, without much regard to the common good. And this without any real desire to injure or retard the other, but entirely through a lack of coordination. While the commandant is the general manager, so far as directing the work to be undertaken, etc., the business of the two departments is run very nearly independently. This is more true of some yards than of others, but is applicable in some degree to them all. What is wanted, therefore, is a business manager, to coordinate the business affairs of the two departments. This officer should not be concerned with the actual carrying out of work in the shops of either department, but should be occupied solely with such questions as issuing one series of job orders when work is authorized, instead of having them issued in two series, as at present; collecting estimates from the two departments, and combining them into one statement, instead of having separate estimates go to the Department; following the progress of work in the two departments, with a view to preventing one waiting on the other, before being able to go ahead with its own, a situation not infrequently arising in ship repairs. In general this officer's business would be to assist the yard to run smoothly as a whole, and thus increase its efficiency. He would have no duties in connection with the military side of the yard, his function being purely industrial. Such an officer could be a member of either of the three corps

most interested in industrial work, the line, the construction, or the pay corps. It would, perhaps, be valuable to have at one yard a line officer, at another a constructor, and at a third a paymaster, to fill this office. In the course of time results would show which was the most suited to the work. It would be necessary, of course, to adopt a thorough going financial system, along similar lines to those suggested herein, before any useful results could be obtained from such a competition.

The managers of the hull and machinery divisions occupy positions which it is believed should in some respects be more clearly defined. These officers, as stated by the regulations, are not the representatives of any Bureau. Nevertheless the tendency still persists to regard the manager of the hull division as the representative of the Bureau of Construction and Repair, and the manager of the machinery division as that of the Bureau of Steam Engineering. This leads to a pulling apart of the two divisions, which is fatal to efficiency. As has been stated, a business manager would aid in lessening this difficulty. It cannot be fully eradicated, however, until it is realized that the efficiency of the yard, its ability to show a profit rather than a loss, is the main consideration, and that the two divisions should have no direct affiliations with the Bureaus. The Bureaus are, in a sense, the customers of the yard. It is their money which is being spent, and their ships which are being repaired and equipped. The relations between the Bureaus and the yard representatives should be somewhat similar to those of the Bureaus and representatives of private plants. They could never be the same, or near the same. But it would be advantageous, for purely business reasons, to simulate these conditions as far as possible. The managers themselves, therefore, representing, as they do, the plant, and not the Bureaus, should have very little voice in the character and extent of contemplated repairs to ships to be undertaken at their yards. These officers, being human, are very likely to be influenced, when recommending repairs, by the fact that certain shops need work, etc. Further, all are familiar with the complaints of officers aboard ship that the yard officers are too much inclined to do things their own way, without giving due weight to the opinions and wishes of those who have to operate the ships and apparatus installed aboard them. While such complaints are often without warrant, it happens that they are sometimes well founded. But if it were understood that the kind of work, and its extent, was

to be settled by the captains and officers on one hand, and the Bureau representatives (the inspectors, of whom more later on) on the other, the managers being called in for advice whenever necessary, but having no voice in the decision, it is believed that things would work much more smoothly. Then, the contemplated work having been decided upon, let the managers take hold and put it through, according to the specifications given them. In other words, do exactly as would be done were the ship being repaired at a private plant. The officers of the ship and the inspectors following the work closely.

The inspectors, should, it is believed, be in very close touch with the Bureaus. In fact, each Bureau should have an inspector (or inspectors) to act as eyes and ears for it at the yard. Many details which are now sent for consideration of the Bureaus could just as well be settled by their representatives, the inspectors, on the spot. All elaborate and detailed reports of costs, etc., would then be unnecessary. In fact, the allotments of funds should be made through the inspectors, who would then be in a position, and would be required, to watch expenditures carefully. The accounting officer, by keeping the inspectors posted as regards the condition of allotments, would enable them to watch the interests of their Bureau carefully, much better than is now done with the Bureaus depending upon monthly reports for that purpose. The above presupposes the disassociation of the managers themselves from the Bureaus, which is regarded as absolutely essential, since a man cannot serve two masters, that is, the yard and the Bureaus.

The advantages of the method outlined above are too numerous to mention. The writer believes that the placing of the inspectors on the basis of directly representing the Bureaus and eliminating the managers from that position would do more than anything else towards the practical realization of efficiency, after the correct financial methods have been installed.

THE WORKMAN'S POINT OF VIEW.

A discussion of navy yard conditions which overlooks the point of view of the mechanics and laborers, whose work forms the most important element of the yard's efficiency, would be incomplete. And yet this is a phase of the subject which usually receives very little attention from those interested in navy yard economy.

In industrial affairs there is always going on a quiet but intense

struggle between the forces of labor and the forces of capital invested in industry. The normal tendency is to keep the wages of labor just above the bare cost of subsistence, the laborer struggling to raise them as much above such cost as possible, and capital striving to depress them a near as may be to equality with it.

Without going into a discussion of the reasons for this condition of affairs, it may be pointed out that the situation of the navy yard employee is usually a shade better than that of his fellow in private plants, since the efforts of capital, as represented by the government, are here very much relaxed. In fact it is possible to treat the whole subject of the relations between employer and employed in a much more humanitarian way, in the government industrial service, than economic conditions permit in the outside commercial struggle.

The most serious factor which confronts the navy yard employee is the reduction of numbers made every now and then, on account of lack of work. This renders his position insecure, and makes it necessary for him to take protective measures. These usually consist in (1) the use of political influence, if possible, to retain his position when work is slack; (2) the use of the same influence to provide work for the yard, in order that his employment may continue; and (3) the extension of each job as long as possible, for the same reason. The first and third methods result in direct economic loss to the yard. The second, while not injuring the yard, is bad for the government itself, since no work not actually needed should be done.

As long as conditions exist as they are at present, with quantity of work fluctuating constantly, the yard workman will be continually insecure in his position, and will of necessity take the measures referred to, for his own protection. Hence the need for equalizing the demand for labor by the introduction of a well-designed manufacturing program, to offset the unavoidable unevenness of repair work. If the yard administration does its part well in the solution of the general problem, it is believed that the workman can be relied upon to do his.

Assume, for illustration, that a fairly constant demand for labor in all departments has been instituted, through the manufacturing of articles for naval use during periods of low demand for repair work (see "Manufacturing in Navy Yard"). The yard workman, feeling more certain of permanent employment, can now be approached with the following arguments: (1) Each yard, being

in competition with other yards, should endeavor to excel in efficiency and economy; (2) to so excel it is necessary for every individual to do his best; (3) by reason of excelling, the yard may expect a more constant supply of work, since the Department will have work done at that yard which does it best and cheapest; (4) by establishing a record for turning out manufactured articles cheaply, a greater volume of such work can be obtained; (5) inefficiency and extravagance will act automatically to check the supply of work, and to cause wide fluctuations in volume of work.

By impressing these ideas on the working force, it is believed that great advances in the direction of economy can be made. There is no question of the intelligence of the American workman, and he can see his advantage as quickly as any man. This has been proved by the success of the methods instituted by leading shop organizers throughout the country.

Mr. F. W. Taylor, in an address before the American Society of Mechanical Engineers, in June, 1903, stated, in reference to his work in making *time studies* that "he has over and over again seen the fact demonstrated that workmen of all classes are not only working, but glad to give up all ideas of soldiering, and devote all of their energies to turning out the maximum work possible, providing they are sure of a permanent suitable reward."

Time studies, meaning accurate recording of the time necessary for average good men to perform certain operations, with scientific premium rates of pay based thereon, form subjects which lack of space would prohibit going into here. They are mentioned, however, as indicating the road along which we must travel in order to achieve true economy. Briefly, it may be stated with perfect safety that there is no field in which the ideas of Mr. Taylor, Mr. Emerson, and other exponents of this school of economic engineering may be better applied than in our own navy yard plants. The subject is somewhat aside from the main objects of this essay, which are intended to relate mainly to the general financial conduct of navy yards.

It is necessary to imbue the workmen with a spirit of pride in the advancement of the yard towards efficiency. This done, harmonious action can be expected in all shops. On the other hand, no yard can be successful which has a body of dissatisfied employees working against the real interest of the plant. Foremen and leading men are particularly susceptible of increasing efficiency due to proper treatment on the part of managers.

CONCLUSION.

The writer has endeavored to make it clear that economy in navy yards can be generally introduced only by the installation of a thorough system of accounts which will cover absolutely all classes of expenditures, throw into relief the major extravagances, and block off or circumscribe the channels through which money flows in such a way that no part may escape into that indefinite region lying between "Military Expenses" and "Cost of Production." Every cent must go into one or the other, and be clearly tagged with its character.

It is, of course, possible to produce economies without reference to such an accounting system. As a matter of fact, an accounting system does not of itself produce any economies at all. It merely points out where the loss is going on, in order that better methods may be instituted. But the attempt to produce economy without the use of proper accounts is bound to be unsatisfactory. First because attention is confined only to obvious extravagances, which may be cured without realization of the effect on other parts of the plant. Second, because it is never easy, and sometimes impossible, to prove that better methods effect a saving. Third, because the efforts of a few reformers only are utilized on certain specific details.

On the other hand, economic results are obtained more easily after the introduction of good accounting methods. First, because extravagancies are shown up all along the line at the same time, and the changes in methods in one place are instantly felt in all other places affected. Second, the proof of economy produced is found in the resultant figures, which take account of everything. Third, because all departments of the plant have their extravagances brought home to them at the same time, and all minds are using their inventive faculties to better the results in local sections.

For the above reasons the writer considers that the most crying need in our navy yards at present is for sound accounting methods. These in effect, the modern shop planning systems, the time studies, the betterment of methods and the actual production of economies can go forward with full assurance of proof being available, step by step, that they are good. In the course of time there is every reason to believe that naval plants, instead of being at the bottom of the ladder of industrial efficiency, may be at the top, and serve as models for private plants to pattern by.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

HONORABLE MENTION.

WANTED—A FIRST AID.

By COMMANDER C. C. MARSH, U. S. Navy.

Motto: Bricks Without Straw.

"Fenced by your careful fathers, ringed by your leaden seas,
Long did ye wake in quiet and long lie down at ease;
Till ye said of Strife, 'What is it?' of the Sword, 'It is far from our ken';
Till ye made a sport of your shrunken hosts and a toy of your armed men."

As bricks cannot be made without straw, neither can ships be fought without men. Two elements are required for this naval success—ships and men; and the goal should be that we have the best of each. A *great* navy is the demand of many; an *adequate* navy is the demand of practically all the people. But ask the man in the legislative hall, the man in the club, the man in the street, what he means by a great navy, and he will answer—battleships. Observe the newspapers, the conversation of intelligent men after the adjournment of Congress, and so far as interest in the navy is concerned, all are happy or depressed in proportion to the number of battleships Congress has added to the navy. The navy is *battleships* in the popular mind. Now there is an obligation on the part of the legislators and the professional men of the navy towards the people that is analogous to that of the family physician to his patrons. And the people will hold them to the same severe accounting that the physician should be held to, who, having observed disease in the body of a member of a family, failed to give notice of its existence and offer a remedy.

All that pertains to the material branch of the navy is well understood, because it is exploited daily. The public understands that with larger ships must come docks large enough to dock

them, the necessity for reserve power, guns, great reserve coaling bases, and large sums are being expended for these purposes.

But towards the *personnel*, the attitude has been the dangerous one of "laissez faire." In the gradual increase of the navy, the personnel has never been considered as an indispensable part of each new unit added to the material of the navy. Along with the battleships, with her armament, equipments, etc., has never been added a clause in the appropriation bill providing for 50 officers and 850 men. A certain number of years elapses; a certain number of new units are added to the navy, and then by a strong request from the Navy Department, more men are added to the navy. This very method of procedure shows some sort of a lack of appreciation of the true relations of the matériel and the personnel in the upbuilding of the navy. To avoid platitudes, yet to attempt to place the *personnel* and the *matériel* in the correct position of their relative importance, let us cite Napoleon who is quoted as saying:

> that in every military campaign the personnel element counts three-fourths; all other elements one-fourth.

Or Farragut, who said:

> In conclusion on this point permit me to say that I think the world is sadly mistaken when it supposes that battles are won by this or that kind of gun or vessel. In my humble opinion the *Kearsarge* would have captured or sunk the *Alabama* as often as they might have met under the same organization and officers. The best gun and the best vessel should certainly be chosen, but the victory three times out of four depends upon those who fight them. (Flagship *Hartford*, Mobile Bay, November 8, 1864.)

As a part of the duty of its military advisors to the people, is that of dispelling such illusions as are harmful. Of such is the Fourth-of-July oration that we can "lick the world." Even a cursory reading of history will show that we have never licked any one except where we were better trained for the specific purpose than our enemies. Other phrases, equally dangerous, are to the effect that "the Civil War was won by the private soldier," or the sense of security that seems to possess the people at the mention of the phrase—"the man behind the gun." Now, the man behind the gun is a part of the great naval establishment—he is not all. It is harmful to suppose he is. Between him and success lies the dragon he must master—*training*. For, by the

man behind the gun is here meant the great number of young and very intelligent men in whom the people place the safety of the country. It is our imperative duty to show the country that a *trained personnel* is as important as are *battleships;* that a *trained reserve personnel* is as important as the *battleships in reserve.* It is necessary that it be understood that it was *recruits* that fought the first battle of Bull Run, and *trained men* who marched through Georgia to the sea. The same source supplied the men who fought with Villeneuve at Trafalgar, and with Suffren in the Indian Seas. It is the personnel that counts; it is the leader that counts, because the trained man is what the leader makes him.

A TRAINED NAVAL RESERVE.

The problem of a trained naval reserve is one that we must solve for ourselves. A study of the methods employed abroad will assist us but little. In fact, the path followed by the other powers is more likely to be to us what the frontiersman calls a "blind trail." For, in the first place, all great powers, except Great Britain, have compulsory military service. This alone places us in a class apart. In the second place, the powers that concern us most—England, Germany, Japan, France—have a large, and in some cases, rapidly growing merchant marine. They also have certain shipping subsidies, and a governmental control over both ships and personnel that will probably never be realized here. There are still other conditions that differentiate us from them. But in brief, the causes that force upon us the solution of our problem are:

a. The form of our government.
b. The character of our people.
c. Geographical conditions.

Causes (a) and (b) are closely bound together, the one being a reflex of the other. We are confronted with the two facts; first, the indisposition of our people to "in time of peace, prepare for war"; and second, that all military service, either in time of peace or war is voluntary. An effort will be made throughout this paper to emphasize the importance of ever keeping in mind the human element.

Cause (c) will be taken up in connection with the subject of organized and unorganized reserves.

DEFINITE REQUIREMENTS.

But to get from general to specific conditions, it is believed that the situation will be this:

A. That in the near future the navy will have in active commission twenty-one battleships, with cruisers, destroyers, submarines and miscellaneous vessels.

B. That there will be in "Commission in Reserve," with partial crews, twenty battleships, cruisers, destroyers and submarines.

C. That it will be imperative to complete to its full strength the first or battleship line.

D. That for this purpose there must be available, subject to the call of the President, 1000 officers and 15,000 men.

E. This reserve force must be organized, equipped and trained; must be mustered into the service without examination, or delays; must be able to reach the distant sea coasts in thirty-six hours.

How and where is such a force to be found?

By developing the present naval militia.

It is, of course, very clear that the personnel of the all-big-gun battleship of 1910 differs radically from that of the battleship of fifty years ago. But to make clearer this difference, there are given below the complements of the U. S. S. *Delaware* (1910), and the U. S. S. *Minnesota* (1863):

	U. S. S. Delaware.	U. S. S. Minnesota.
Petty Officers (Line)	81	52
Seamen	129	138
Ordinary Seamen	190	145
Landsmen	..	171
Boys	..	44
	—400	—550
Artificer Branch	52	..
Artificer Branch (Engineers):		
Petty Officers	66	..
Firemen	100	25
Coal Passers	112	33
	—278	— 58
Miscellaneous:		
Yeomen, Hospital Stewards, etc.	37	2
Messmen	46	..
	— 83	— 2
Total	813	610

In the old *Minnesota* the engineer's force was 9 percent of the total complement; in the *Delaware,* it is 40 per cent.

These mere figures, however, do not begin to tell the story. In the class marked "Artificer Branch" on the *Delaware,* apart from the painters, plumbers, etc., are twenty-eight electricians and four wireless operators. On the twenty-eight electricians devolves the care of all the machinery that operates every turret, ammunition hoist, fire-control apparatus and miscellaneous machinery. On the four wireless operators devolves the system of communications that alone makes possible the scouting, the dispersing and combining of squadrons, and all else that constitutes the strategy of the campaign before the fleets meet and the tactics after the battle begins. Nor is this all. Of the eighty-one so-called line petty officers, thirty-two are gunner's mates and turret captains, whose efficiency is rated far more by their mechanical than their seamanship qualifications.

It is impossible to imagine a similar number of men on the old *Minnesota* whose existence was as vital to the ship as are these men to the *Delaware.*

The conclusion is evident. The modern man-of-war is a marvelous machine, and for her operation requires *mechanics* of the highest skill.

It will be demonstrated later on that that absolutely necessary quality for naval efficiency—hitting the target—is being now accomplished in the fleet by young men enlisted from the interior of our country, serving on their first enlistment, and whose "sailor knowledge" is confined to that acquired in the few months in the navy.

With these facts (and they *are* facts and *not* theories) before us, it seems to be the part of wisdom, in formulating any scheme of a "reserve," that we recognize the requirements as they are, and endeavor to meet them. Traditions die hard. There is no tradition that is more reluctantly given up than that the "Naval Reserve" shall be recruited from "the sea-faring population," yachtsmen, etc. Such men are not required for the navy; they form a minute proportion either of the annual recruits or of any of our ships. Still, of such must be the naval reserve. We might as well bury the tradition. We are not dependent on that class, which is fortunate, because it does not exist.

It is clear, then, that the requirements are:

a. Skilled mechanics to fill all the mechanical ratings.

b. Intelligent, strong, young men, to be trained into the ratings of the seaman branch.

It seems inexplicable that in a country where the mechanical trades have reached the highest efficiency, and where technical schools are abundant, there should be any question of finding the necessary men to fill all the requirements of class (a). Nor, equally, that there should be any question of the necessary number of young men to fill class (b). The authorized enlisted strength of the navy is about 48,000 men. And the Navy Department is able, spite of the rigid mental and physical requirements, to keep its quota full. This, however, is difficult in the higher ratings in the skilled mechanical branches. The reason is simple. The skilled mechanic is, on shore, a well-paid man. The attractions of family, etc., are stronger than the desire to go to sea. In time of war, however, this is changed. Such men will go then. But that they may go quickly, that they may be made to feel they will step at once into billets in which they can serve their country by means of the skill they know they possess, they must be interested and educated in the nature of this emergency service they propose to render. Let us give one concrete example. A—— B—— is the chief boilermaker of the establishment of X—— Y—— in the city of Providence, Rhode Island. He is also a member of the naval militia of Rhode Island. As a member of the Rhode Island Naval Militia his interest in the navy is aroused, and kept alive. He cruises in summer on the small vessel assigned the State, or he takes his turn on the battleships for the summer exercises. The Navy Department prepares examinations for boilermakers, which he successfully passes. His name is so registered in the office of naval militia, and in the division of enlisted personnel in the Bureau of Navigation. War threatens. The naval militia of Rhode Island is ordered to report at the Boston Navy Yard. There are vacancies to be filled on the *Connecticut*, the *Vermont*, the destroyer *Flusser*, the ammunition ships and many others. Each man before he left Rhode Island had in his pocket the station billet of the ship to which he was assigned. He stows his bag and hammock; knows his station—perhaps had made his last summer cruise on that self-same battleship. There is the whole story. Multiply this instance by thousands and you see the invaluable function the naval militia can perform.

But What is the Naval Militia?—The naval militia is an organization consisting of 540 commissioned and warrant officers, and 5961 petty officers and men. There are local branches in twenty-one States. The members join that they may be trained in time of peace to serve in the navy in time of war.

The dates the organizations were created in the several States are given below:

	Date.		Date.
1. Massachusetts	Mar. 29, 1890	12. Louisiana	Sept. 11, 1895
2. New York	June 23, 1891	13. Ohio	July 26, 1896
3. California	Sept. 3, 1891	14. Georgia	Oct. 26, 1896
4. North Carolina	—, —, 1891	15. Maryland	—, —, 1896
5. Rhode Island	—, —, 1891	16. District of Columbia	May 11, 1898
6. South Carolina	Nov. —, 1892	17. Maine	Apr. 2, 1903
7. Pennsylvania	Jan. 6, 1893	18. Minnesota	Dec. 15, 1903
8. Illinois	Sept. 30, 1893	19. Missouri	Dec. 18, 1905
9. Connecticut	Nov. 27, 1893	20. Wisconsin	June 29, 1909
10. Michigan	Mar. 1, 1894	21. Indiana	Aug. 24, 1909
11. New Jersey	May 20, 1895		

In addition to the above there were organizations created in the States of Washington, Oregon and Florida during the present year, which organizations are awaiting the action of their several legislatures during the coming winter. In general, the naval militia is a part of the militia of the State, the phraseology being something to the effect that "such part of the State militia as the governor may elect shall constitute a naval militia." Up to the year 1903 the land and naval militias were upon practically equal terms. But by the passage of the Act popularly known as the "Dick Bill" (after its advocate and promoter, Senator Dick, of Ohio), the land militia became an organized national guard, subject to the direct call of the President of the United States, a status desired for the naval militia, and for which there is now a bill before Congress, introduced by Representative Foss, and favorably recommended by the House Naval Committee.

It will be seen from the dates of creation of the several organizations that they were not the result of any emergency, or threatened disaster, nor are they the result of any hysterical and ephemeral patriotic wave. They are the calmly thought-out desire of a body of patriotic citizens. Space does not permit an adequate description of the earnest work, the personal sacrifices of time and money, the hours devoted to study and drill, the discouragements, the rebuffs encountered by the officers and men of the naval militia in their determined effort to make organizations for

the benefit of the navy, and thereby for the general government. Attention is invited to the register of the commissioned and warrant officers of the naval militia of the United States, 1910, for in that publication will be found the refuting of so many mistakes that exist in the mind of the ignorant. It will there be seen, for instance, that of the seven captains, three entered the service in 1891, one in 1892, two in 1894, and one in 1901—an average service of nearly seventeen (17) years.

It will be seen that there is in the naval militia one captain for every 824 enlisted men; one commander for every 289 men; whereas, in the navy there is one captain for every 555 men, and one commander for every 375 men. The bulk of the officers is in the junior grades—enthusiastic, intelligent young men, capable of being developed into excellent officers.

Let is be stated here clearly and distinctly that the naval militia is what it is through its own efforts. The Navy Department has been reasonably generous in the granting of requests; it has advanced—offered—until recently, nothing. Let it be just as clearly stated here that the naval militia craves the sympathy and assistance of the navy. It is ready to follow wherever the navy will lead it, be it in the matter of training in time of peace, or into the thick of the fight in time of war. The naval militia is the ideal field from which to recruit and train just the men to fill the requirements outlined earlier in this article. It needs only to be directed, to be told what to do, and it will immediately set about fulfilling the directions given it. Let is be understood that up to the time of the war of 1898 the naval militia had been trained in nothing larger than a ship's cutter; that the naval militia is now manning completely, with its own force, vessels from the *Chicago* down. To illustrate the statement that the naval militia need but to be directed, let these instances be cited: The naval militia of the State of California, having passed from strictly shore and armory work to the U. S. S. *Alert,* consisted of eight divisions, of which seven were deck or seaman divisions, and one engineer division. When the *Alert* was replaced by the U. S. S. *Marblehead,* the necessity at once appeared for more engineers, for electricians and mechanics, and without even waiting for suggestions from the Navy Department, there were four more engineer divisions created. In Massachusetts, the naval militia (19 officers and 369 men) took the U. S. S *Chicago* for

a ten days' cruise. The ship's company was, in general, very complete, but strange to say was short on electricians. It happens that the officer in charge of the electrical division is in the employ of the General Electrical Company, of Boston, as well as having been four years at the Naval Academy. He was asked if he could not recruit an electrical force, to which he replied: "Certainly, from our own electrical works." It is unnecessary to multiply instances.

The officers are many of them graduates of the highest universities and technical schools. From such an education they have become men of great affairs. They are accustomed to issuing orders and having them obeyed. They have been given opportunity to take the course at the compass office at the Naval Observatory in Washington, and are availing themselves of it as the chance offers. They are given the benefit of the branch hydrographic offices throughout the country, and no organization is without one or more officers skilled in compass work. The contract between the Secretary of the Navy and the governor of a State requires, when a vessel is loaned a State, that the commanding officer and senior engineer shall have merchant marine licenses. Instead of this requirement applying to only these two officers, the States are requiring that every deck officer and every engineer shall have such a license. This requirement is the demand of the naval militia themselves.

WHAT IS THE AIM OF THE NAVAL MILITIA?

Simply, as stated before, to train in peace for war. But how? Their aim is to supply the Navy Department, on a telegraphic call, when emergency arises, a number of thousands of officers and men to be assigned to service as the Navy Department may deem best. It is important that this point be made clear. It will be explained later what is meant by organized and unorganized reserves, but for the present it is desired to explain that the naval militia (which is an organized reserve) has no belief that they can render the maximum service to the country by being assigned as an organization to any specific ship or duty. While conscious of their zeal and capacities, they are also conscious of their limitations, and believe that they can render the best service by being detailed as a part of the complements of ships already partly manned by the regular service. They will, therefore, when they

have reported at a navy yard, be detailed as the Navy Department elects, in numbers dependent on the requirements of each case.

In every system of education, be it for the regulars, or reserves, or militia, the education of the officers is of paramount importance. This is the age of specialists, and in the naval militia, by proper direction, an invaluable corps of specialists can be developed. Navigators can be found who are not necessarily either engineers or turret officers; electricians and engineers or turret and gun division officers have their special qualifications. From no known source can there be recruited officers who can fill all stations as can the officers of the regular navy who have given their life to the work. But it must be apparent that if there can be found in the naval militia, or elsewhere, an officer who can satisfactorily fill one station—engineer, navigator, or electrician for instance—he thereby sets free the officer of more extended attainments. These classes are mentioned first not because of their greater importance, but because they are those who bring their life profession with them when they enter the naval militia preparatory to entering the navy in time of war. The commanding, executive and division officers, no matter what their profession in civil life, must be trained for the specific work on board ship.

The records from the fleet show that midshipmen, with an education mostly theoretical, are assigned as seconds, or even as firsts in turret and gun divisions on the battleships, and given a deck watch in maneuvers. The records also show that the gun divisions under these young officers have made highest scores. This is specializing in its highest degree. And the writer believes that with a consistent and progressive system of training, most valuable officers can be trained in the naval militia, sufficiently advanced to enable them to take up duty on any class of ship on which they are a minority in a complement of regular officers and men.

The officers then, of the naval militia, expect to enter the navy in time of war in such rank, and such positions as they have been found qualified to fill. They desire to be given the opportunity to "qualify" and, having qualified, to be given rank and duty accordingly. The impression seems to exist in the navy that in time of war a naval militia organization, with a superabundance of high rank officers, will expect to enter the navy *as a body*, and be

assigned as such to a large ship, or to replace on such a ship regular officers and men of long service. Exactly the opposite is true, as, it is hoped, has been shown. In any case, the whole matter of the detail and assignment is in the hands of the Secretary of the Navy.

ORGANIZED AND UNORGANIZED RESERVES.

An *organized* naval reserve is a body of officers and men existing by authority of a national or state legislative Act and formed into units, "divisions," "battalions," or "ship's companies," according to the phraseology of the Act, and all united under one command.

An *unorganized* naval reserve, as its name implies, its without that combination of officers and men formed into units, but consists simply of individuals.

In the United States there is at the present time not one officer or man belonging to any *official national naval reserve,* organized or unorganized.

There is the imperative necessity for both an organized and an unorganized naval reserve. There is no conflict between the two; they are each to serve their important purpose, in their own way.

The *organized reserve* is to fulfill the requirements of the title of this paper—"WANTED—A FIRST AID." Since the whole body of an organized reserve lives in one locality, or at least is subject to one command, it is always to be ready to respond *as a body* to the call of the President. The whole organized reserve of the United States should be at the sea coast within thirty-six (36) hours from the hour of the issue of the call, or it has failed of its function. Diplomacy, fear of giving undue offence to the power with whom relations are strained, and with whom war threatens, will surely cause the delaying of mobilizing reserve ships until the last minute. When that fatal moment does come, our only hope is to be able to complete the first line of battle in the quickest possible time, and with the most efficient possible force. With an organized reserve, every detail can have been perfected in advance. Every officer and man can have his station billet in his pocket. It will need only a telegram to effect the rest. To illustrate, even from our own small experience, let there be cited the following from the records of the Spanish-American War:

Navy Department,
WASHINGTON, D. C.
April 23, 1898.

(Telegram) To Adjutant General Samuel Dalton, Boston, Mass.

Send *Prairie's* complement officers and men to her at once at Brooklyn Yard. (Sd.) T. ROOSEVELT.

This despatch was received in Boston at 1.30 p. m., April 23, and the whole force—officers and men—was at the New York Navy Yard at 9 o'clock the next morning. Had the *Prarie* been at the Boston yard, or had the complement been selected from the New York militia, the order would probably have been complied with in six hours.

It is with the idea that this case, representing a small force, may at the proper time in the future represent a force sufficient to mobilize the entire reserve fleet that the organized reserve is regarded as a necessity.

It is, therefore, recommended that the government adopt and consistently pursue a definite policy concerning the creating and developing of a organized naval reserve. To this end, it is recommended that the strength of this force be:

1,000 ..... Officers.
15,000 ..... Men.

The solution of this problem is rendered simple by reason of the fact that there is an organized naval reserve, consisting of 540 officers and 5961 men, known by the title of naval militia, and which has for years been knocking at the door of the Navy Department asking for admittance to the ranks of the nation's defenders, asking for a more definite status, asking for more thorough instruction, asking for more responsibility, and asking in return nothing but the privilege of serving in the navy in time of war.

It has been stated above that the naval militia is a part of the volunteer militia of the States, such part, in fact, as the governor of the State may elect. It has been clearly demonstrated that the governor and the State legislature are willing to increase the size of the naval militia in proportion as they make good, in proportion as the demand for increase is impressed upon them. It is certain that in proportion as the Navy Department lends assistance, shows interest, gives encouragement, the naval militia advances. It is believed that not only can the size of the organized

naval reserve above set down be attained, but that the requests for enlistment will be such that only the best men need be accepted.

Until the year 1903 the militia, land and naval, was a militia pure and simple. It could only be called out by a requisition on the governor of the State, who complied or not as he saw fit. The militia could not be compelled to serve outside their own State. There was no governmental control whatever. If there is one point made clear in his remarkable book that General Upton has left us on the military policy of the United States, it is the necessity for a—

National Army of Volunteers and
Long Enlistments.

Our history is replete with instances of campaigns that could not be pushed to completion by reason of "short-time men," or campaigns abandoned by reason of "time-expired men." More than a hundred thousand men were called out at intervals by State governors for the defence of Washington, only to have the capital city fall a prey to a handful of British who found no one to oppose them. To remedy all these defects there has been passed by Congress the before-mentioned Act known as the Dick Bill, which, however, applies only to the land militia. To establish an organized naval reserve there is now before Congress the "Act to Promote the Efficiency of the Naval Militia and for Other Purposes."

This bill provides:

That in the event of war, actual or threatened—or rebellion—or whenever the President is unable with the regular forces at his command to execute the laws of the Union, it shall be lawful for the President to call forth such number of the Naval Militia as he may deem necessary—and to issue his orders through the governor of the State *to such officers of the Naval Militia* as he may think proper.

That whenever the President calls forth any part of the Naval Militia he may state in the call the period for which such service is required, and the Naval Militia so called shall continue to serve during the term so specified, *either within or without the territory of the United States, unless relieved by order of the President.*

PROVIDED: That if no period be stated in the call of the President, the period shall be held to mean the existence of the emergency, *of which the President shall be the sole judge.*

That every officer and enlisted man of the Naval Militia who shall be called forth in the manner hereinbefore prescribed, shall be mustered for service without further enlistment, and without further examination pre-

vious to such muster, except for those States (if the case may so be) which have not adopted a standard of professional and physical examination prescribed by the Secretary of the Navy for the Naval Militia. PROVIDED, however, that any officer or enlisted man of the Naval Militia so qualified who shall refuse or neglect to present himself for such muster, upon being called forth as herein prescribed, shall be subject to trial by court martial, and shall be punished as such court martial shall direct.

That the Secretary of the Navy is to provide for the participation by any part of the Naval Militia in any cruise, maneuvers, etc., of the regular Navy.

Authorizes the Secretary of the Navy to permit officers or enlisted men of the Naval Militia to attend at any naval professional school, or on board ship.

Authorizes inspections, and detail of Naval officers as instructors of the Naval Militia.

Authorizes the establishment of an "eligible list" for reserve officers. By this is meant that the Secretary of the Navy may prescribe qualifications, and prepare examinations suitable for each grade of each corps of the Navy. That officers of the Naval Militia may be given an opportunity to take such examinations, and if successful it shall entitle them to be enrolled on the list of "eligibles," and in time of war to be commissioned in the Navy in accordance with the rank in which they have qualified.

(All other features of the bill are administrative matters and need not be quoted here.)

This bill may not be perfect. A similar bill has enabled the army to make great strides towards the establishment of an efficient and increasing organized national guard. With such a bill as a base upon which to stand, the navy can build a structure proportional to the time, the patience, the heart it puts into the work. Defects, which time proves to exist, can be remedied by the same legislative body that passes the creative Act.

Unorganized Naval Reserve.—This desirable body should consist exclusively of—

The desirable discharged men of the navy.

To be limited to 50,000 men.

A bill has been introduced into Congress providing for a reserve of this character.

With two such reserves, it is believed the navy can face an emergency with a confidence it cannot now feel.

There is, it is believed, a confidence existing in the minds of the navy and the people regarding both the number and the character of the men who will flock to the colors in time of war that is not justified by the facts.

We may assume that the patriotic feeling will bring in, in time, sufficient men for all the requirements of the navy. However, it is the imperative necessity for men at the outset—men sufficient to man the reserve ships, to complete the first line of battle—that is our greatest requirement. Illustrations of more than one point will be drawn from the recent Japanese-Russian War. In no particular is the lesson more instructive than in this that when the Japanese began war on February 6, it was the *Japanese Navy* that sailed from Sasebo, moving on to its advanced base on the Russian frontier from which it never receded.

ENLISTMENTS IN THE SPANISH-AMERICAN WAR.

In view of the often-expressed belief that in time of war there will be a regular stampede towards the naval recruiting stations, the return of the discharged man-of-war's men, the reported thousands of American sailors on the Great Lakes, etc., let us examine the following figures from the Report of the Bureau of Navigation, Navy Department, for 1898:

FOR THE YEAR—JUNE, 1897-1898.	MEN.	APPRENTICES.
Applications for enlistment	71,112	3,212
Rejected for physical disabilities and other causes	63,135	2,269
FOR THE YEAR—JUNE, 1898-1899.		
Applications for enlistment	38,687	3,069
Rejected for physical disabilities and other causes	31,346	2,154

These figures show the great necessity for some weeding-out system.

The real point is, however, the enlistments as they actually occurred. They were:

During the year 1898, month of—	
April	2,314
May	3,660
June	2,910
July	1,228
August	237
September	109
October	205
November	187
December	225
	11,075

In other words, it took two months, including a period of five weeks, after war had been declared to get 5974 men. It must be remembered that the U. S. S. *Maine* had been blown up in February. Relations with Spain were most strained. War seemed inevitable, was declared on April 21, and the country was elated over the victory in Manila Bay on May 1.

The 5974 men enlisted during two months are less than the strength of the present naval militia, which, as an organized naval militia, is available on telegraphic call, and should be on board ship in thirty-six (36) hours.

It will be observed that of the applicants for enlistment about 12 per cent were accepted. It is further a matter of record that of the 11,075 enlisted, the naval militia furnished 3832. And as an additional instance of the value of preparation, the records show that when the naval militia organizations presented themselves for examination for enlistment, there were accepted between 85 and 95 per cent. The number enlisted for the war was 11,045. The strength of the navy at the time was 12,500. In other words, the strength was doubled. By a similar token, a war at this time would require an additional 45,000 men. Each year that passes will increase the need for a reserve; for the reason that each year adds to the "ships in reserve." At the time of the Spanish-American War the effective navy was in commission. Little if anything was added that increased the real fighting strength of the navy, a condition that will not exist again.

It is believed that the foregoing demonstrates the necessity of an organized reserve, and the means by which it can be created.

The *unorganized* reserve is to consist of the desirable discharged men of the navy. By the payment of a small "retainer" these men are to enroll themselves in the Navy Department, and be available in time of war. It is presumed that they left the navy because they prefer to take their chances in civil life. Their character is such that we must assume they attain even more than an average success. With success in business will naturally follow the interests inherent in human nature—wives, families, homes of their own, local affiliations. To regain these men in time of war will be a priceless boon for the navy. To create such a reserve is invaluable. It is a question, however, that needs must be carefully considered as to whether these men, with the in-

terests as enumerated, will be able to meet that instant response so much needed; whether to arrange their affairs will not require a few days here, perhaps weeks. Admitting that such is the case, the value of the plan is in no sense diminished. For, with the first emergency met by an organized reserve, the individuals of the unorganized reserve come just in time to man the later ships, to fill vacancies, and to furnish the trained leaven to the mass of recruits that are being enlisted.

There is, however, one feature that is likely to be lost sight of, and which is vital to any plan of reserve that is dependent on voluntary service. This feature is the "human element." Man by nature is a gregarious animal; he loves the contact, the association of his fellow men. This is illustrated not merely by the crowding of the population into the cities from the country, but by the further and more intimate grouping of men into clubs, into the so-called "secret societies"—the Knights Templar, Odd Fellows, and many others—whose total membership amounts to millions. Men who have a common interest desire to get together, at least at intervals, to discuss those interests. It is frequently called talking "shop." To keep going a movement that is once started it is necessary to assemble the members to exchange views; it is necessary to inject a certain amount of the social into the "shop." This is the experience of the world. It is believed that herein lies the danger of an unorganized reserve. With the individuals located at places rather remote from each other, with no common meeting place, with no enthusiast to keep alive the interest of the more or less indifferent, we must not be surprised if the organization falls to the ground by reason of a lack of a cementing force. This is shown to a degree in the navy league of the United States. The writer has discussed the subject with isolated members, and has been told exactly what is set down above: To keep the interest alive, the members must get together. The fact remains that in a population of some ninety millions, and with the navy at the pinnacle of its popularity with the people, the membership of the navy league is still small. Nor must any analogy be drawn from abroad. In England, for instance, all ports are practically sea ports, and all England is interested in matters concerning the sea.

THE COST.

It is not easy to estimate the cost of an institution the existence of which may save a nation's honor. Still, since the question is asked "What will it cost?" meaning dollars and cents, let the answer be given in dollars and cents. The general government appropriates each year for "Arming and Equipping Naval Militia," $100,000, increased this year to $125,000. This pays for the uniforms, small arms, and equipments, coal for cruising, ammunition, medical stores, etc. The force thus provided for numbers 6500. The government further loans to the naval militia organizations vessels, boats and certain equipments for training purposes, and keeps the vessels in repair. This sum, when charged up against the organizations, more than doubles the expenditure. It has been the practice heretofore to loan to the naval militia vessels that were of little value to the navy. Vessels of such a character were expensive, as is any old type and largely worn-out machine. The system adopted by the Navy Department this year, however, will result in greater economy to the Navy Department, and vastly greater benefit to the organizations being trained. This system consists in loaning to the naval militia, or in placing in "Commission in Reserve" and assigning them to the naval militia for training purposes, vessels that have a real military value—vessels that when war is declared will be called into active service. It can readily be shown that by maintaining the vessels in this status, always ready for service, is a distinct financial gain to the Department, entirely apart from the valuable service they are rendering in the building up of a trained personnel. For instance, the gunboat *Detroit* cost, while lying at a navy yard, out of commission, and therefore receiving no care in her up-keep, $530.00 per month; and the small cruiser *Boston* cost $750.00 per month. Both these vessels were recently stricken from the navy list and advertised to be sold as being unfit for repair.

But from any point of view, education is an article of great cost, as any man of a family will testify. Or, seen from another point of view, if we take all the property making up the educational plant of a city, and add to its value the expenditures in salaries and wages, and divide this by the school attendance, or by the number of graduates, the cost per individual turned out will be astounding.

In the case in point, however, the mind must not divorce itself entirely from sentiment; this particular education, the training of a "Reserve," is not merely to save the billions of dollars that an unsuccessful war will entail, but it is to save as well the nation's honor.

FOR WHAT SHALL THE RESERVE BE TRAINED?

The answer is simple. The "Reserve" should be trained as are trained all recruits, all officers and men who are to serve in the navy, for general service. It is not necessary to enter into the discussion as to what will be the character of the service of the reserve in time of war, whether it be in the "first line," "inner line," or what. The Navy Department in its wisdom will assign the most fit to the most important stations, of which it will be the sole judge. The difference between the more fit and the less fit should not be a question so much of the character of the training as of the degree of excellence attained. No organization, regular or reserve, can claim for itself any duty it is manifestly not qualified to fill—the claim must be based on the ability to perform the duty. In this particular, it is believed profit can be derived from the experience of others. There existed in England up to the year 1903 an organization known as the Royal Navy Artillery Volunteers. The duty of this organization was to man certain coast defence fortifications, smaller vessels operating along the coast in rather restricted waters. In fact, the duty was distinctly confined to local waters. In that year—1903—a commission was appointed to inquire into the matter of reserves. The conclusion of this commission, in brief, was that it was best to return to the old Nelsonian doctrine that the "enemy's coast line was England's frontier," and that the matter of a coast defence of the character implied in the duties of the Royal Navy Artillery Volunteers was abandoned, and that organization was wiped out of existence. Henceforth, there was to be no class of reserve not available for all kinds of duty, and the training was to be given in the British home fleet. On the abolishing of the above-mentioned body a new one was created to be called the Royal Navy Volunteers. This is an organized naval reserve, the only one in England, and its nature is exactly like our naval militia, with that further control by the general government that might be expected in England, and which is the hope of the naval militia for their own

organization here. It seems to be inevitable that the same spirit that actuates a man in time of peace to join a "Reserve" organization, will actuate him in time of war to be keen to get to the front. It is a splendid manly spirit that is worth fostering. The question then remains—can he be sufficiently trained, and if so,

HOW SHALL THE RESERVE BE TRAINED?

The answer to this question again is simple. It consists in developing, improving, perfecting the system that is being now employed with the naval militia.

There is no question but that the naval officer will welcome any efficient body of "Reserves." He is willing to lend a hand in the training of those reserves. It is also equally true that the naval officer who falls in with the naval militia becomes convinced of the value of that body.

WHAT IS THE PRESENT SCHEME OF TRAINING OF THE NAVAL MILITIA?

By their regulations they are obliged to attend at not less than twenty-four drills during the year, and to take part in the summer exercises. This is a mere outline—the minimum requirements. To nearly every organization throughout the country a naval vessel of some type is now assigned. On this vessel are made many short cruises in addition to the annual cruise. This will be found to be in excess of the requirement of almost any naval reserve in the world. The scheme that is being developed in the training of our naval militia—worked out in all ignorance of any system employed abroad—is, however, the embodiment of the doctrine that the enemy's coast line is our frontier, and that all reservists must be available for all kinds of duty. All training that does not bear directly on naval duties have been abolished. The armory work during the winter is made to bear directly on the work afloat during the next summer. To this end let there be cited some of the apparatus supplied the armories, and the character of the instruction books issued:

Signals.—An ardois, two illuminated semaphores, two complete sets of signal flags, hand semaphores, and wig-wag.

Ordnance.—A 4-inch (or 3-pounder) gun, latest type of mount, with Morris-tube apparatus, telescopic sights, etc. A sub-target gun. All vessels assigned the Naval Militia are equipped with either two 4-inch or

two 3-pounders, depending on their size, and competitive target practice is to be held under strictly naval requirements.

Navigation and Seamanship.—The armories and ships are equipped with all necessary training gear. The libraries are supplied with ample books, and the compass course at the U. S. Naval Observatory in Washington has been thrown open to the Naval Militia officers, and such a number have either taken the course there or have availed themselves of the branch hydrographic offices throughout the country, so that all organizations have navigators versed in the compass.

In accordance with the plan that all training should be strictly naval, and that the officers and men should be familiar with naval practices, the following books and pamphlets have been prepared and issued during the current year:

NAVAL MILITIA PUBLICATION.

No. 1.—Training of Gun Pointers.
No. 2.—How to Stand Watch.
No. 3.—Method of Conducting Target Practice.
No. 4.—Tactical Signal Book for the Use of the Naval Militia.

The following are some of the publications purchased and issued:

Hints for Junior Officers Doing Line Duty.
On the Management of the Ships in a Fleet.
The Modern Officer of the Watch.
On the Care and Management of Steam Machinery and Boilers.
Nulton on the Compass.

The above are essentially for the education of the officers, and have been especially selected, or prepared, for that purpose. They are additional to the standard works on all professional subjects, and to the books issued for the education of the enlisted men, such as—Petty Officer's Manual, Boat Book, Recruit's Hand Book, Ship and Gun Drills, etc.

With the preparation derived from the winter's study and drills, the season's work begins about May and lasts till November. It will be too long to do more than give a summary of the character of the summer's exercises. Where possible, groups of naval militia vessels are assembled for what may be called squadron drills. This is particularly true on the Great Lakes, where squadron exercises have been held for several years. Regarding these exercises, suffice it to say that the vessels are manned, navigated, maneuvered exclusively by the naval militia. And it is no slight tribute to the skill of the officers to state that this squadron navi-

gated at eight-knots speed, preserving good distance and formation, through the St. Claire Lake and River, and the Detroit River from Lake Huron to Lake Erie, encountering the immense mass of shipping that traverses those waters, at one time finding themselves on the Lime Kiln Flats with three lines of passing merchant vessels abreast, and yet never having a break in the formation. On the Atlantic Coast the Massachusetts Naval Militia, with 369 officers and men, manned the U. S. S. *Chicago* on a cruise from Boston to Hampton Roads and return, encountering dense fog, and rough weather, and, with their own navigator, entered and left both Boston and Hampton Roads without a pilot. The Connecticut Naval Militia accompanied the *Chicago,* manning the *Machias.* The California Naval Militia cruised in the *Marblehead* from San Francisco to Bremerton, Wash., via Portland, Ore., and returned to San Francisco. The Louisiana organization cruised similarly in the Gulf of Mexico on the *Isla de Luzon,* and other organizations made equal cruises in the vessels assigned them. Two points call for especial notice as emphasizing the progress in the training, and the attitude of the Navy Department in this matter of the naval militia.

These are the placing of valuable naval units "in commission in reserve," assigning them to the naval militia for training purposes, and the assignment of the naval militia to the battleship fleet for the period of their summer exercises. In the first instance, the U. S. S. *Chicago, Ozark, Tonopah, Amphitrite* and *Cheyenne* have been so assigned this year. In the other instance, the assignment of the naval militia to the battleship fleet for their exercises, neither the navy nor the naval militia can adequately express their gratitude to the present commander-in-chief of the Atlantic fleet for the interest he has shown in this matter of reserve training, and for the precedent he has established in this regard. One week of his own summer program he set aside, and fourteen battleships were detailed for the excluside training of the naval militia. The plan is to assign about sixty men and four officers to each ship. The naval militia thus see the latest type of ship, under the normal conditions of naval life. It is believed that by a plan that involves a system of alternation between the battleship fleet, and exercises on their own State assigned vessel, the naval militia, or by whatever title the naval reserve is called, will be given the nearest approach to ideal training.

The subject of how the naval militia is being trained has been gone into at some length, at the great risk of tiring the reader, because the gist of the whole matter lies here, that if this system is correct, or approximately so, it need only be improved, and perfected and applied to any reserve, organized or unorganized, that may be created.

This, then, is believed to be the situation—that there are required an *organized naval reserve* of 1000 officers and 15,000 men, and that the instrument is at our hands in the naval militia; and an unorganized naval reserve of 50,000 men to be recruited from the desirable discharged men of the navy.

The recommendations from the Navy Department for the creation of a naval reserve have contained the same phraseology for many years. They involve the incorporation of the Revenue Marine Service, Light House Service, Coast Survey, Merchant Marine and yacht squadrons. It would seem that this scheme is along the lines of robbing Peter to pay Paul. It would seem that the duties devolving upon all the above bodies, with the exception of the last, will be as important in time of war as in peace. The British government has awakened to the fact that if it called the Royal Naval Reserves into the navy, its invaluable merchant marine must either be laid up or pass into the hands of foreigners.

These facts prove that our reserve must be created apart.

Much can be done by legislative action; much by Departmental aid and sympathy: but in a country where all military service, as well as the preparation therefor, is voluntary, a "Reserve" is only possible when it is created by a serious and patriotic impulse within the hearts of the people. The inculcation of this spirit should be begun at home. It should be developed practically at schools, and every high school in this country should include military training.

Sons of the sheltered city—unmade, unhandled, unmeet—
Ye pushed them raw to the battle as ye picked them raw from the street.
And what did ye look they should compass?
Warcraft learned in a breath,
Knowledge unto occasion at the first far view of Death?

* * * * * * * * * * * *

But ye say, "It will mar our comfort." Ye say,
"It will minish our trade."
Do ye wait for the spattered shrapnel ere ye learn how a gun is laid?
For the low red glare to the southward when the raided coast towns burn?
(Light ye shall have on that lesson, but little time to learn).

KIPLING.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

ON THE TRUE RELATIONS BETWEEN THE DEPARTMENT OF THE NAVY AND THE NAVAL WAR COLLEGE.

By REAR-ADMIRAL S. B. LUCE, U. S. Navy.

1. The sole reason for the existence of the Navy Department is the probability of war.

2. The most important office in the Navy Department (after that of the Secretary of the Navy) is the office of naval operations.

3. All other offices in the navy are merely subsidiary to that one particular office—the Office for the Conduct of war.

4. The several bureaus of the department, the navy yards, and naval stations generally, each and all, exist solely for the one great end—to contribute, each in its own way, to the successful conduct of war under the Secretary of the Navy and his chief director of naval operations.

5. Inefficiency in this one office (the office of naval operations) means the wreckage, in time of war, of the entire system. Hence the supreme importance of the office cannot be exaggerated.*

6. Military history teaches that a general staff, composed of officers specially instructed in staff duties, is a necessity. Says a high German authority: †

> The General Staff forms an essential part of a modern army organization; . . . it has grown in importance with the numerical increase of modern armies, and the development of military training and efficiency.

* It means, in short, naval disaster in war and national humiliation, as in the cases of Cervera and Rozhestvenski at Santiago, Cuba, and Tsushima, respectively.

† General Brousart von Tchellendorff on "The Duties of the General Staff."

7. "The Staff College" (for training officers for duties on the general staff) "owes its origin to the experience of the Great King (Frederick) in the Seven Years' War."

8. It has now come to be well understood that what is true of a land army, in this respect, is equally true of a sea army. A naval general staff, under whatever name may be preferred, is absolutely necessary to the proper conduct of naval warfare with this marked distinction: that a naval general staff is a small and very simple organization compared to that of an army.

9. To prepare officers for duty on the general staff requires special training—as for any other specialty.

10. For the training of officers for staff duties, staff colleges have been established (see par. 7).

During his last campaigns, Napoleon began to reap the advantages of an institution which had been under his fostering care, and a host of distinguished young generals fully justified the praises which the Emperor lavished on his "poulet aux oeufs d' or," the hen that laid him golden eggs.

11. The Naval War College, which is essentially a staff college, was established for the express purpose of training officers for naval staff duties.

12. The object was to enable officers to prepare themselves by a course of conscientious work, for duty in the most important office in the Navy Department next after that of the Secretary of the Navy, namely: for the Office of Naval Operations.

13. Through want of understanding the importance of the War College, together with a misconception of its true character as an educational institution, the Navy Department has failed to reap a tithe of the benefits the college had to offer.

14. The annual conferences of only four months' duration, and their often inconsequent conclusions, have deluded the service at large into the belief that the college had nothing better to offer.

The real work of the College has been done by the members of the staff during the winter months. To refute the service idea that the College has "no studies of utility," it is only necessary to call attention to Rear-Admiral Mahan's great works on Sea Power, which were first given out in the form of lectures delivered at the College. There are many other valuable papers which have been developed by the staff members, and used by the Navy Department.

15. During the past twelve years of its existence the request for additional officers to carry on the college work has been met by the assurance that there were "no officers to spare."

16. It is not the lack of officers that has retarded the development of the War College. It is the lack of appreciation on the part of the naval service of the relative importance of naval duties. The profession has nothing higher of attainment than the mastery of the art of war.

17. On the scale of educational values, the War College stands at the head, not even excepting that great School of Application—the fleet. For War College training means the direction of the operations of the fleet.

18. Appreciation of relative educational values would suggest that, in the assignment of officers to duty, the Naval War College should receive the very first consideration. A War College diploma should insure the holder the most important duties the navy has to offer.

19. Of every ten officers who pass through a term of a year or more of Naval War College work, there will not be more than one, or at most two, who will develop an aptitude for the particular kind of work required on the general staff. An officer may excel in ordnance or in gunnery; he may be a good linguist or a mathematician, and yet discover no aptitude whatever for the work of planning naval campaigns. Nevertheless, in every instance, conscientious application to the War College course has broadened the officer's mind and vastly increased his capacity for higher tactical command. Hence the double necessity for passing the greatest possible number through the mill; first, to prepare the many for the higher commands which will come to them in their professional career; secondly, to discover the few fitted to fulfill the requirements of the Office of Naval Operations.

20. The Spanish War forced into existence the semblance of a staff under the name of "The War Board."

21. An outgrowth of the war board of the Spanish War is the present *General Board* which was designed originally to perform all the functions of a naval general staff and to have nothing whatever to do with matériel.

22. The navy regulations of 1909 provide that the General Board "shall coordinate the work of the Naval War College, the

Office of Naval Intelligence and the Board of Inspection and Survey." (Chap. 1, Sec. 2, par. 5). This provision of the regulations effects a complete change in the character of the college. It diverts it from its original purpose as an educational institution; converts it into a part of the organization of the Navy Department, and imperils the plan for the higher education of officers which was the main object in the establishment of the college.

23. To sum up: it is quite clear from the foregoing that the true function of the Naval War College is *educational, not executive*. It is not a war board, nor a naval general staff. It forms no part of the *working organization* of the Navy Department, but supplies the material wherewith to construct such an organization. It devotes itself to the study of naval history, naval strategy and tactics, the law of nations, and *academic discussions* of all conceivable types of naval problems of war; it supplies the alumni from which to select officers competent to command our fleets as well as those able to solve correctly the *actual* problems with which a naval general staff is bound to be confronted, a duty generally of a nature so confidential as to prevent its being delegated elsewhere, and which should be the sole function of a board sufficiently strong and able to constitute, both in peace and in war, the backbone of the Department of the Navy.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE FIGHTING EDGE

A TRACT FOR THE TIMES.

By LIEUT.-COMMANDER W. P. CRONAN, U. S. Navy.

"Of all these, the Belgae are the bravest, because they are farthest from the civilization and refinement of our Province, and merchants least frequently resort to them, and import those things which tend to effeminate the mind; . . . ." *Cæsar's Commentaries, Book I.*

"History repeats itself" is an axiom which is particularly true in military and naval annals; had Cæsar been an admiral he might well have complained of the enervating influences of protracted stays in the Roman navy yards where his crews would doubtless have been pestered by those itinerant vendors of whom we find the modern prototypes in Sands Street and in the Great White Way.

Let us take well to heart the lessons of naval history, ancient and modern, as well as those which are analogous in campaigns on land, for the ethics of all fighting are the same, and what was true in 1812 and 1861-65 is true to-day as far as personnel is concerned.

In these days of high living and luxury, cold storage and ice, we may well ask ourselves if the fighting men of to-day have kept pace in themselves with the development of the equipment for war at their disposal.

I make a plea for the predominance of military ideals in all our modern naval training, rejecting, without sentimentality, all that has become obsolete.

Times change, and the improvements in the arts and sciences far exceed any corresponding improvement which can be noted in the fitness for war of the human being.

Were John Paul Jones alive to-morrow, it may be assumed that with only a superficial training in the general features of modern equipment, he would make a first class commander-in-

chief of a modern fleet; he possessed the fighting edge, the power and ability to place military ideals and aims above all else.

We are told that Collingwood was a finer seaman than was Nelson—but there seems to be no doubt in the minds of students of naval warfare that Nelson was the better naval officer.

Seamanship is an art, and a most attractive and necessary one; but the best seamen are born, not made, whereas organized naval warfare is a science, the attentive study of which is the paramount duty of every naval officer.

In 1865 the navy of the United States was, to all intents and purposes, 20 years ahead of its time; it comprised a military fleet, of heavily armed and armored ships, of which we may say one at last, the *New Ironsides,* was a logical precursor of the modern all big gun ship.

Yet it was not a fleet in the true sense, because it was not homogeneous in type, nor did the exigencies of the service require it to be handled as a co-ordinate whole against an enemy's fleet. But our navy was on the right track—it was military and its ideals were those which beget success in war.

The writer, while at the War College in attendance upon the conference of the summer of 1909, was much impressed by the remarks of Rear Admiral Sperry upon this subject, in relation to the necessity of maintaining a military fleet as the backbone of a navy; as well as I remember, that learned officer referred to anything else as "a mob of ships."

If we had a mob of ships in 1865, what, in all charity, can we call that heterogeneous collection of naval antiques which in 1885 were inferior in military effectiveness to their predecessors of more warlike days?

A long period of enervating peace during which the only naval event of importance, to judge from written records, seems to have been the visit of the frigate *Congress* to the Centennial Exposition in 1876, succeeded the civil war; the traces of the Collingwood ideals engendered in this period are still with us.

The dignified and stately rites attendant upon post-prandial crossings of top-gallant and royal yards, to the querulous and fitful piping of multitudinous boatswain's mates, I fear were held in higher favor than the perfunctory performance of less spectacular duties with the obsolete batteries: this within the memory of many who have not yet dined in solitary state, "cribbed, cabined and confined."

There are those of us who have served in modern fighting ships, the atmosphere of which was perhaps not military; where the celerity with which all boats were cleared away and stood off under sail equalled that which we are told obtained in the days of the "*Swatara*"—"*O sepulchra sacra.*"

A splendid thing—a pretty thing;—but the time and attention devoted to the high degree of perfection attained in boat sailing was being used by another ship in painstaking training in the minute details inseparable from success in elementary gunnery, the results of which were apparent at the next target practice.

It is a pretty sight indeed to see a well-trained gig's crew of six good men and true pulling three miles against a leeward ebb on an official visit, but in these days of efficient gas engines, tended by one man, the gig, if engined, might get there and back much sooner and the other five men be kept at more important tasks.

It is nothing but maudlin sentiment which makes us retain a single drill or evolution or custom of the past which detracts from the efficiency of the present.

The greatest room for the employment of skill on the part of a naval officer of the line is in the training and development of the personnel; ours is fortunately of the best type; our men are young and their minds are plastic; the high degree of efficiency which can be attained within a short time, during short enlistments, is best evidenced by the notable strides which have been made in gunnery.

Since 1902, which marks the advent of what the writer chooses to call the Renaissance, there has been a steady and marked improvement in the efficiency and tone of the service, due to a solid and firm adherence to military ideals, as indicated by the constant improvement in gunnery, the development of which has reacted favorably upon the whole service.

If any division officer of the fleet be asked what men of his division give him the least cause for concern and need the least supervision in regard to neatness and personal appearance it is undoubtedly true that he will name the men who hold the most responsible military positions, as gun pointers, gun captains, hoistmen, plugmen, etc.

They have received the preponderance of military training, and it has reacted favorably upon their bearing as man-of-warsmen.

Attention to detail in the uniform, and above all else, to the manner in which it is worn, is the soul of discipline on board ship.

In a stroll through the streets of a foreign town during the visit of our fleet on the cruise of 1908, it would need no more than the casual glance of a practiced eye to separate the men of the U. S. S. *Efficient* from those of the U. S. S. *Mediocre* without so much as a glance at a cap ribbon—(save to see that the ends were taut).

It is not enough that our modern man-of-warsman should shoot straight—he will do that with enthusiasm, but prefers to do it in dungarees, and that tendency can only be overcome by a rigid insistence upon exactness in uniform and military bearing; the one can and should go hand in hand with the other.

As a general rule, the smartest men at muster are the gun pointers; the reason why, because they carry the mark which shows their skill, and perhaps, also, that gift of the gods, the "E" which denotes supremacy.

It is not without good purpose that the All-wise Creator put curly feathers in the game cock's tail.

It is not necessary to be dirty to be efficient—let us strive to make smartness in uniform and bearing the result of military efficiency and prowess. One cannot blame the crew of the U. S. S. *Efficient* for being cocky because their ship excels in gunnery—for it is more than probable that she also leads in the steaming competition; has the best race-boat's crew and baseball and football teams. If, then, her men are the more apt to keep their neckerchiefs tied aright and cuffs turned down far from the piercing eye of the master-at-arms, may we not say that we have come into our own?

It may be asked what relation careful attention to the petty details of uniform and bearing have to the military efficiency of the fleet—in the writer's opinion it has a great and far-reaching influence.

The long period of training through which the British fleet passed under the iron rule of Jervis prepared its personnel to gain the triumphs which followed the supreme tests under Nelson's leadership—without that training and consequent esprit de corps, Nelson's genius would have been of no avail.

In keeping our helmet strings taut, it is not too much to ask that they be knotted properly and in the right place.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

SHOULD THERE BE AN INTERNATIONAL NAVY?

By COMMANDER T. W. KINKAID, U. S. Navy.

1. Looking back at the inception and history of the Hague Tribunal, it must be conceded, I think, that the institution has "made good." Its sessions have been attended by some of the most able representatives that the countries of the world could summon; and at least several of the agreements reached at the conferences have commanded wide respect and have made for lasting peace. Quoting James Brown Scott's "Texts of the Peace Conferences": "Since the meeting of the First Hague Conference, four great and important cases have been submitted to the Hague Tribunal, have been adjudicated, and the judgments cheerfully and promptly accepted by the litigating nations."

2. But such progress as has been achieved to date has come in spite of an obvious defect of plan. To be sure, there are many peace-loving and well-intentioned enthusiasts who contend that the Tribunal as now constituted and supported is practically sufficient in all respects for considering and solving all questions that are likely to disturb the world's peace. But, on the other hand, those persons whose contention is that no permanent or great good can be accomplished by a court that has not a backing of adequate military force are doubtless in a great majority. Quoting Scott again: "It may be maintained that international law is law in the strict sense of the word, or it may be contended that it lacks an essential element of law, because there is no international sheriff."

3. Considering the situation of our own Supreme Court, our citizens are at all times more or less conscious of the fact that the decisions of that august body are entitled to and in case of necessity would receive the backing of the entire military force of the country administered by the President and supported by the Congress.

4. The criticism that the Hague Tribunal has no military support need not always exist. The object of this brief paper is to suggest that the leading nations of the world unite for the formation and maintenance of an international navy.

ORGANIZATION AND MATERIEL.

5. Let us assume that in the beginning a special conference of representatives of twelve of the leading nations has brought into existence a treaty binding each of the high contracting powers to contribute to the international fleet a force consisting of twelve first-class battleships, twelve torpedo-boat destroyers, and three scouts, all fully manned. Here we have to start with:

144 battleships
144 destroyers
36 scouts.

6. Each contribution of twelve battleships should involve the detail of three flag officers, preferably with the rank of rear-admiral.

7. It is not the object of the present writer to offer a perfected scheme of command; but it seems necessary to suggest a plan for determining the three or four ranking officers of the fleet.

8. It is proposed that there be designated by election, each flag officer having one vote, one high admiral, one admiral, and one vice-admiral. Thus would the supreme command be provided for under whatever contingencies would be likely to arise.

RENDEZ-VOUS AND DRILLS.

9. The treaty authorizing the fleet should make due provision for securing such neutralized harbors and islands as would be necessary for the overhaul of the materiel, and for exercise of ships and personnel near shore. If several suitably situated islands in the Atlantic and Pacific Oceans, having good and commodious harbors, and good grounds for infantry drill purposes, could be secured, the fighting efficiency of the great force could be maintained at all seasons.

MAINTENANCE.

10. It would undoubtedly be necessary for the several contracting nations to withdraw a vessel or vessels from time to time, replacing those withdrawn by others in good repair. It could reas-

onably be expected that each of the nations would take pride in furnishing as its fleet representatives the best vessels of the authorized types that it could produce.

11. It is suggested that the furnishing of its quota of vessels to the international fleet should not in the least degree debar a nation from carrying out any building or maneuvering program that it might choose to indulge in. But, should the project of an international fleet realize the hopes of the present writer, the maintenance of a large individual naval force in addition to the international quota would within a few years be manifest folly.

12. Contributions of money for the support of the fleet should of course be provided for in the treaty.

SECESSION.

13. It is suggested that the treaty should provide that none of the contributing nations should withdraw its vessels or its personnel without giving at least six months' notice of its intention so to do; and that it should be the sworn duty of the commander-in-chief to prevent, by force if necessary, any withdrawal of vessels or personnel except in accordance with the provisions of the treaty.

USE OF THE FLEET.

14. Assuming that the formation and organization of the fleet are realized, how shall it be directed and used? I cannot conceive of any better source of authority than the President of the Permanent Court of Arbitration. At once there comes to mind the enormous responsibility and power that by this plan must be invested in one man. Will the nations ever reach an agreement as to this question? Will they make the Hague Tribunal the Court of Courts? Will they make the president of the Court virtually President of the World? Perhaps a prolonged campaign of education will furnish the answer.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

ADVANCE BASE TRAINING.

By MAJOR HENRY C. DAVIS, U. S. M. C.

The discussion relating to the marine corps, and the ultimate employment of that corps, has occupied the minds of many service people for the past two years. It is not with any desire to discuss the question of its use on board ship, which was so thoroughly gone into by Congress in the winter of 1908-09, that the writer gives his views, but rather to propose something which he believes will be of immense benefit to the marine corps and thus to the naval service. There has been established by the marine corps, at the naval station at New London, Conn., a school known as the "Advanced Base School," and the officers assigned there are doubtlessly receiving an amount of instruction in a little known course which will be of intestimable value to them. However, up to the present time, in so far as the writer is aware, the instruction is purely theoretical. To be of lasting benefit and value to these officers and to the marine corps, this theoretical instruction must be supplemented by the practical work which would be performed by an advance base force in the seizure of a designated spot.

How are we to give this instruction to any such force?

If we assume, for discussion, that a commander-in-chief will not, except as a last resort, deplete his forces afloat by the detachment of a portion of them to seize and hold a spot as an advance base, it at once becomes apparent that some force additional to the fleet force must be available for that duty.

There is no such force available at the present time *as a force*. There are men who have had work at different times and places in connection with such military operations but we have no body of men trained for the work and whose officers have had practical experience. What force can we take and train for this most important work?

There are on duty in the United States, on the east coast, marines who are available for this as well as their routine navy yard duties. These men are doing the things that perfect the recruit in his duties; they are receiving the training that is necessary for all soldiers at the outset of their military careers; but, aside from their target practice and parade ground evolutions, they are not learning the things that are so essential to the soldier in the field.

This is not a criticism of the system but a statement of what is being done at the majority of posts in the United States. The drill the men receive in battle formations and tactics is largely, if not wholly, confined to the drill they can receive on a rather small parade ground. Its scope is necessarily as limited as the parade ground.

I wish to impress upon the reader the fact that these statements are not made in a spirit of criticism but rather to show that what I propose is not only feasible but most desirable.

The question then is, "How train a force for advance base work?"

It has been the custom for many years for the Atlantic fleet to have its target practice and other fleet drills each winter in Guantanamo Bay, Cuba. Every winter, when the fleet goes there, I would mobilize at Norfolk, Va., a regiment of marines, fully officered and organized, and, with ships which the navy has available for transports, I would embark this force provided with the advance base outfit as outlined by the general board. This force I would have at the disposal of the commander-in-chief and he should be instructed to use it as he would in time of war in the occupation of an advance base. The actual crew of the transport I would limit to the force necessary to run the ship's machinery, man the boats, cooks, mess attendants, electricians, etc. The transports would then be convoyed by the fleet, or a portion of the fleet, and conducted to the rendezvous as though a state of war existed. Arriving at the rendezvous the regiment should make its preparations for landing with the advance base outfit and establish itself exactly as though on active service. The vast bulk of the advance base outfit, it must be understood, would of course take much time in landing, but the thing should be gone through just as though we were doing it to hold the spot from an active enemy.

Can anyone doubt that such training would be of the greatest

value to officers and men? Would not the expense be as much justified as that connected with the annual army maneuvers?

The result would be that we would have a body of men who would have had the practical experience necessary for success in time of war. On the other hand, by neglecting to so train a sufficient force of officers and men, we are liable to have to take a green outfit of both to do work which appears vastly important to me.

Lieutenant-General Von der Goltz, in his book "The Conduct of War" (page 86), says, "However much their military expeditions may have been characterized by audacity, yet all great commanders have attached the highest value to the possession of a good base." And again on page 92, "A fleet and a land army can afford one another immense support in pushing forward a base if the theater of war is bounded on one side by the sea."

While these quotations hold more for army than for naval bases, yet the importance of having some immediate force ready to take and hold an advance base cannot be too highly estimated. It may even arise that the advance base taken primarily for the navy may from necessity be later occupied and used by the army.

Mr. Lea in "The Valor of Ignorance" (page 224) says, "Navies are not self-sustaining in any degree whatsoever. Nothing that is necessary for their maintenance can be gotten by them out of the sea. The vast theater of war where their campaigns are made and battles fought is as barren as the desert. *In consequence, naval bases are as necessary as fleets in every sea where nations have established or expect to extend their suzerainty.* (The italics are mine.) And further he says, "The security of naval bases rests fundamentally with their land defense." These statements are based on the idea of the United States taking and preparing the territory already owned by them, but, inasmuch as there appears to be no likelihood of the United States doing this in time of peace, there is all the more reason why we should have ready and trained a body which can at least offer sufficient resistance to an enemy until reinforced by the land army which any defense needs.

There will doubtless be objection to this plan of going each year to the South for drill. Some will complain of being routed out of their homes for three or four months; others will base their objections on their experiences with previous floating battalions;

and the author frankly states that if the experiences of these latter officers have not been magnified he in no way blames them for their objection; but there will be this difference, that this force will have a definite object and a definite time of operation, and that when this is finished it will be returned to its stations. It must be understood that it is by no means intended that this regiment is to be kept with the fleet or that it is to be used except as a force to be instructed in advance base work.

So thoroughly do I believe that this programme will give us the training we need that I would recommend a force of similar strength to be used in Cape Cod Bay every fall for similar drills.

The outfit which goes to Cuba in the winter should, before returning to the United States, be taken for a trip to Europe both for the benefit of the men from the sea experience and also for keeping that part of the Government's announcement on the enlistment poster which offers an opportunity to see foreign countries.

Because our men have not the ingrained respect for discipline and authority found in other armies and navies, due to our different ideas of caste and social relations, we are apt to call it "independence of thought and spirit," characterizing the other men as mechanical in the performance of duty, etc. *Nothing could be further from the truth.* Our independence of thought and spirit too often turns out to be the pride of ignorance, whereby men, through some peculiar mental process, are ashamed to ask "How" and "Why" even when they are ignorant of the subject at hand.

The great ignorant public is too prone to pat the rankest militiaman or the rawest rookie on the back and tell him he can lick the world, and the poor ignorant rookie and militiaman believe it until they have met trained soldiers. Then their blood pays the bill which ignorance always presents.

But to go back a bit. Suppose such an outfit as suggested is on its way to some rendezvous for drill; how could it be occupied? Naturally the first consideration is that of landing the force after arrival and to do this the ships' boats, helped out by some flat bottomed lighters, would be necessary. Then, under the protection of the fire from the convoy or some designated ships, the debarcation would take place just as though in service.

After a foothold is gained we must begin the landing of the material of the advance base outfit. While this is being done by a portion of the force others would be preparing the land defenses.

gun emplacements and store houses, laying out camp, clearing the ground, etc.

All those things which would have to be done in active service could be done by this and similar forces once or twice a year and the result would be that we would have a force at the disposal of the Government *always ready and trained for its work.*

The question of the administration of discipline while the troops were on board might cause some discussion; however it is believed this point could be settled between the commanding officer of the ship and the commanding officer of the regiment on board.

The time will come when we will be called upon to perform work which foreign armies have found it takes years to teach men; then we will find that our men who are "so quick to learn" are but little better than a flock of sheep. They won't have time to learn and it won't be their fault that they don't know. It will be the fault of those who are in positions to know the importance of such training yet deny us the opportunity to obtain it. The responsibility for our ignorance will be placed by the public on the shoulders where it belongs, and then the loss of important places will bring home the shortsighted policy of neglecting every real preparation for their defense. Only when we have tried and have seen the willing but ignorant application of force to the problem in peace time can we realize what the result will be in war.

We must therefore begin now and we must work constantly to secure even a passable degree of efficiency in a class of work entirely our own and of which we should make a specialty.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

NAVAL STRATEGY IN A WAR BETWEEN ENGLAND AND GERMANY.

By PROFESSOR WILLIAM HOVGAARD, Late Commander Royal Danish Navy.

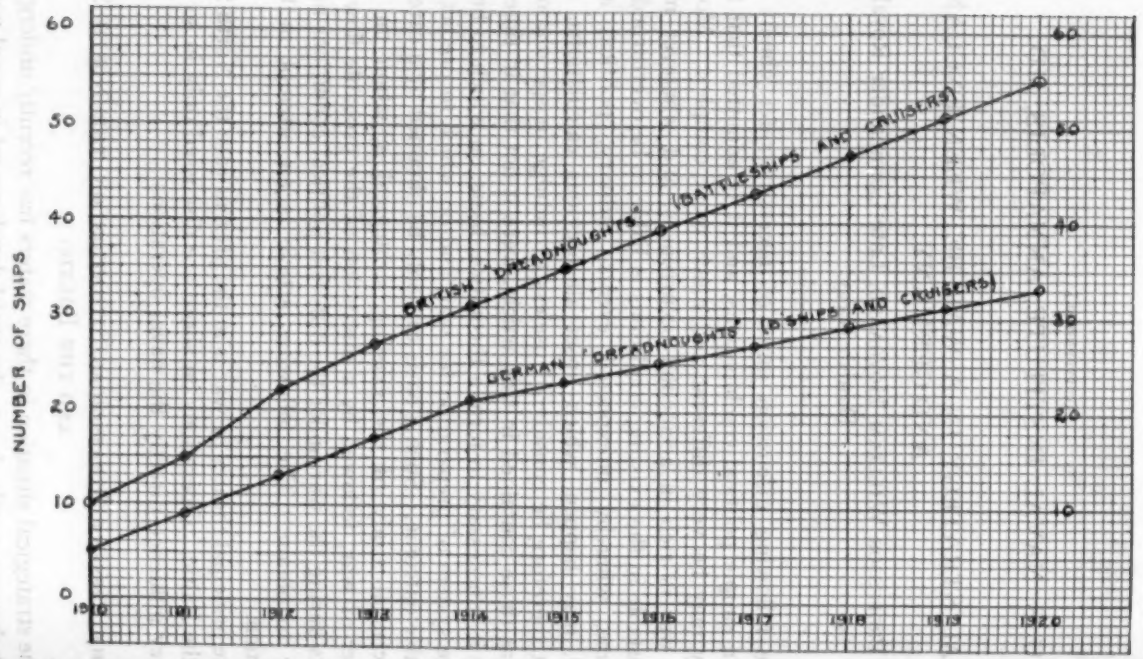
The following discussion must of necessity refer chiefly to certain simple political combinations, and it is admitted that the reality may be very different and much more complex. Moreover, war is rich in accidental occurrences, and whatever may be unstable in the existing conditions is liable to be overturned in wartime, whereby unexpected events, military, political and social, may happen, which upset all previous calculations. It might therefore be considered useless to indulge in speculations, such as those contained in this article, were it not that in time of peace it is necessary to form a theoretical basis, on which to build up the system of preparation for war, and on which to predict its probable outcome. Such a basis can only be obtained by a careful and critical study of the existing strategical situation on the theater of war, followed by a discussion of the probable flow of events during the war under the different political conditions most likely to obtain. The following article is an attempt in this direction.

The principal theater of war is in the present case the North Sea and the Baltic. Operations on shore are discussed only in so far as they influence directly the naval operations.

I. THE PRESENT STRATEGICAL SITUATION ON THE NORTH SEA AND THE BALTIC.

The strategical situation in these waters has recently undergone great changes, partly due to the rapid development in naval power of England and Germany, partly due to changes in the disposition of the naval forces and their bases, and finally due to the

PLATE I.—A COMPARISON BY NUMBER OF BRITISH AND GERMAN DREADNOUGHTS.

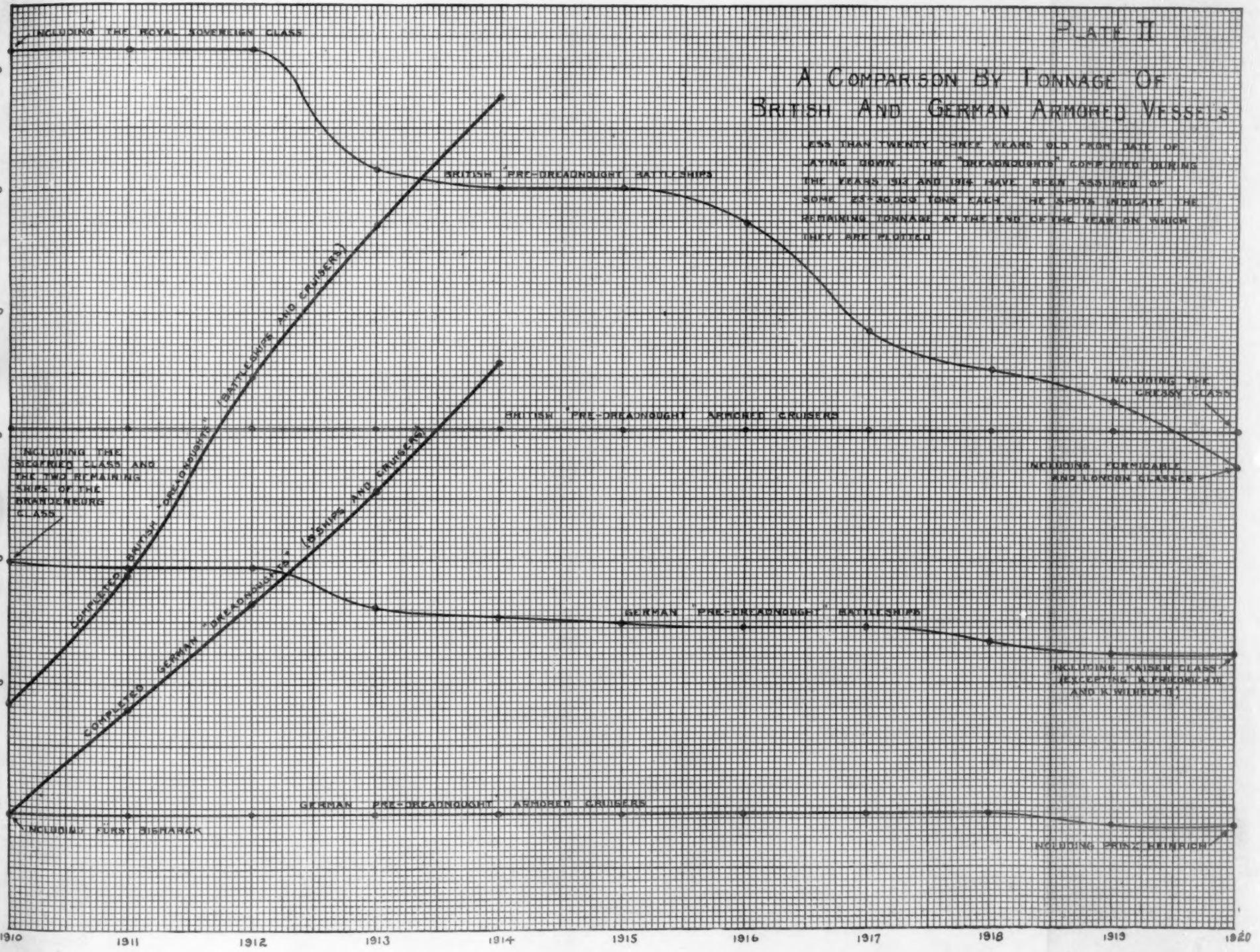


It is assumed that during and after the year 1912, Germany will lay down only two Dreadnoughts a year, while England will lay down four. The rapid rise in number of British Dreadnoughts in 1912 is due to the two armored cruisers for Australia and New Zealand. The spots indicate the number of completed ships at the end of the year on which they are plotted.

PLATE II

A Comparison By Tonnage Of British And German Armored Vessels

LESS THAN TWENTY THREE YEARS OLD FROM DATE OF LAYING DOWN. THE "DREADNOUGHTS" COMPLETED DURING THE YEARS 1913 AND 1914 HAVE BEEN ASSUMED OF SOME 25+30,000 TONS EACH. THE SPOTS INDICATE THE REMAINING TONNAGE AT THE END OF THE YEAR ON WHICH THEY ARE PLOTTED



It is assumed that during and after the year 1912, Germany will lay down only two Dreadnoughts a year, while England will lay down four. The rapid rise in number of British Dreadnoughts in 1912 is due to the two armored cruisers for Australia and New Zealand. The spots indicate the number of completed ships at the end of the year on which they are plotted.

advent of certain technical features, which have greatly influenced the conditions of naval warfare. We shall discuss each of these points separately.

1. *Relative Development of the British and the German Navies.*

In the year 1900 the total tonnage of large armored German ships was about one-seventh of that possessed by England, in 1910 this ratio had grown to more than one-third, and in 1914 it will be about one-half. The naval budget of Germany amounted in 1910 to one hundred and nine million dollars, as against about two hundred million dollars for England.

The development during the period 1910-1920 is illustrated by the diagrams on Plates I and II, which explain themselves. It shall be here only remarked, that on Plate I, which gives the *number* of "Dreadnoughts" (battleships and cruisers), it has been necessary to make certain assumptions as to the ships completed after 1914. In the case of Germany it has been reckoned, in accordance with the existing program, that during and after 1912 only two such ships are to be laid down each year, while for England it has been assumed that four ships will be laid down each year during and after 1912.

On Plate II, which gives curves for *tonnage*, both for "Dreadnoughts' and "Pre-Dreadnoughts," the curve for the "Dreadnoughts" could not be carried beyond 1914, since it is impossible to estimate the size of ships laid down several years hence; even the tonnage for ships, which are to be completed in 1913 and 1914, had to be guessed. The accompanying table gives the status at the end of certain years.

In the calculations for Plate II the rule of the German "Flottennovelle" of 1908 has been used both for German and English ships. According to this rule the life of a ship is 20 years from the date when the first appropriation is given plus the time used in the construction of the "Ersatzschiff," which has here been assumed to be three years as a maximum. Instead of the date of appropriation the year of laying down has been here used. Thus a ship which, like the *Royal Oak*, was laid down in 1890, is included in the list at the end of 1912, but is not included at the end of 1913.

There is for our purpose no necessity of comparing the strength in the lighter types of ships; it may be safely assumed that both

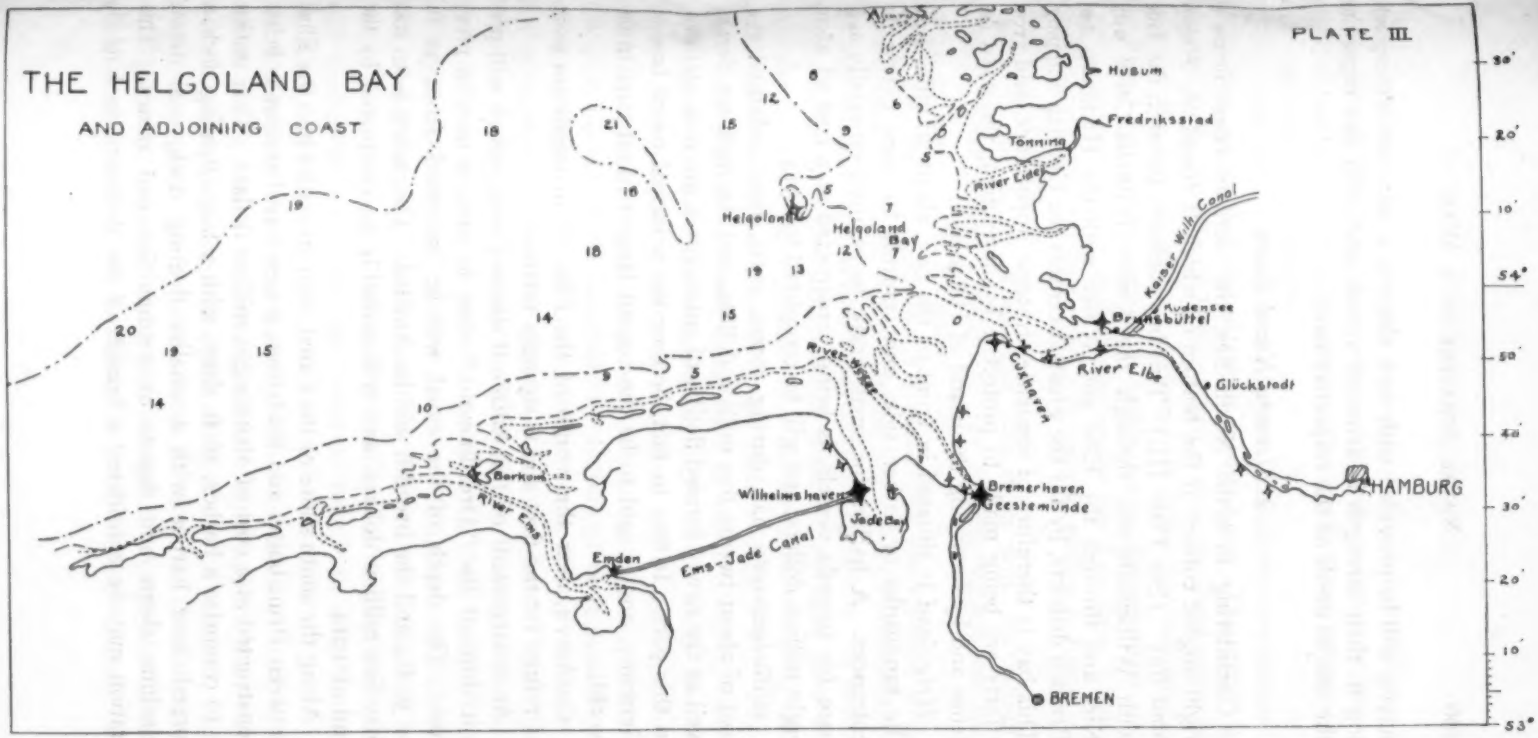
COMPARATIVE TABLE

FOR ENGLISH AND GERMAN ARMORED SHIPS NOT LESS THAN TWENTY THREE YEARS OLD FROM DATE OF LAYING DOWN

ENGLAND								
END OF	COMPLETED "DREADNOUGHTS" (BATTLESHIPS AND CRUISERS)		"PRE-DREAD-NOUGHT" BATTLESHIPS		"PRE-DREAD-NOUGHT" ARM. CRUISERS		TOTAL	
YEAR	NO.	TONS	NO.	TONS	NO.	TONS	NO.	TONS
1910	10	183,000.	49	714,000.	34	407,000.	93	1,304,000
1912	22	445,000.	49	714,000.	34	407,000	105	1,566,000
1914	31	675,000.	41	602,000.	34	407,000	106	1,684,000
1920	55	———	25	377,000.	34	407,000	114	———

GERMANY								
COMPLETED "DREADNOUGHTS" (BATTLESHIPS AND CRUISERS)		"PRE-DREAD-NOUGHT" BATTLESHIPS		"PRE-DREAD-NOUGHT" ARM. CRUISERS		TOTAL	
NO.	TONS	NO.	TONS	NO.	TONS	NO.	TONS
5	93,000.	30	298,000	9	95,000.	44	486,000.
13	264,000.	29	294,000.	9	95,000	51	653,000.
21	460,000.	22	253,000	9	95,000	52	808,000.
33	———	18	224,000	8	84,000	59	———

1920	55	———	25	377,000.	34	467,000	114	———	55								



navies will be provided with such ships in a measure corresponding to their strength in armored vessels and with due regard to the special needs of the respective navy.

2. *German Naval Bases.*

Considering first the North Sea, the German coast forms a right-angled corner, at the bottom of which is found *the Helgoland Bay*. (See Plate III.) This bay connects through the Jade with Wilhelmshaven, through *the Kaiser Wilhelm-Canal* with Kiel and through the Elbe and Weser with the Hamburg and Bremen districts, by far the greatest centers for German shipping. This bay is therefore of immense strategic importance, and great efforts are being made to protect it by developing the coast defense and by fortifying the island of Helgoland.

Helgoland is situated in front of the bay, about 20 miles from the sandbanks on either side, and controls to some extent the entrances. A harbor for small craft, to be used especially as a base for torpedo vessels, is being constructed at a cost of about eight million dollars, and will be completed by 1914.

Wilhelmshaven has, during recent years, been enlarged at a cost of about twenty-five million dollars, and the high-sea fleet as well as the newly formed flotilla of submarines, are now stationed in this port. It has, in fact, become the principal naval base of Germany, and is said to be the second largest naval port in the world.

Cuxhaven, near the mouth of the Elbe, is an important point of refuge for the fleet and is strongly fortified.

An enlargement of the *Kaiser Wilhelm-Canal*, which will permit ships of the "Dreadnought" class to pass, is now in progress. The depth of the canal will be increased from 30 ft. to 36 ft., and the breadth will be doubled. This work is to cost fifty-five million dollars, and will probably be completed by the end of 1914.

Along the south shore of the Canal, near its outlet into the Elbe, between Brunsbüttel and Kudensee, a new naval station is being constructed at a cost of about eight million dollars. This station is to comprise a harbor, 36 ft. deep, with a large floating dock, a torpedo-boat harbor with a smaller floating dock, coal depot, machine shops and depots of ammunition and mines. This station may be considered a branch of the dockyard in Kiel; it

is to form a safe place of refuge and of assembly for the fleet and will be useful for repair and supply. It will probably be completed at the same time as the canal. The fortifications at Brunsbüttel are being strengthened.

Some fifty miles westward of the Jade we find the fortifications of *Borkum*, protecting the entrance to the Ems. This river is adjacent to the frontier of Holland, and is thus the most westerly outlet on the German coast. Although Borkum lies outside the Helgoland Bay, it belongs to it strategically, inasmuch as the Ems is connected with Wilhelmshaven by the Ems-Jade Canal, which is navigable for destroyers. A torpedo station is found on the Ems at Emden.

Similarly the *Eider*, which has connection with the Kaiser Wilhelm-Canal, forms a débouché for torpedo vessels on the eastern entrance to the Helgoland Bay.

Although the coasts of *the Helgoland Bay* are studded with fortifications, it is to be noted that the inner line of communication between Kiel and Wilhelmshaven is not complete. In order to pass between Wilhelmshaven and Brunsbüttel, ships have to cross the open bay for a distance of some 20 miles, rounding the sandbanks between the mouths of the Jade and the Elbe. Formerly this navigation could take place in relative safety, since the German cruisers and destroyers might drive away hostile torpedo craft, but in a future war conditions will be different, due to the advent of the submarine boat. A blockading enemy may now push his submarine boats into the bottom of Helgoland Bay, and these cannot easily be driven away. It is likely, moreover, that an enemy would make extensive use of mines. Thus the stretch of open water between the Elbe and the Jade may be rendered entirely insecure to pass for the German ships, and in fact the whole bay may be rendered insecure. It appears, therefore, that a canal between the Jade and the Elbe is much needed to complete the connection between the two great naval ports, and thus secure the advantage of "interior lines" in an absolute manner.

A blockade of the Helgoland Bay proper, placed as it is in a corner of the North Sea, would at first sight appear relatively easy to carry out on account of the small arc to be watched, viz., a channel of about twenty miles width on each side of the island of Helgoland. Cruisers, which may succeed in passing the blockading vessels unseen, for instance on dark nights, will, on the

next morning, if going north, find themselves in the middle of the North Sea, and going west, they cannot have reached farther than the eastern entrance to the channel. In either case they are liable to be discovered and intercepted by the enemy before they reach the ocean, and before they can do any serious injury to English commerce. Sorties by the German battle fleet will probably be observed and reported before the fleet has proceeded far into the North Sea. It is, however, to be noted, that German torpedo-boats and submarines have an excellent advanced base in the new harbor of Helgoland. Moreover, the right wing of the blockading force will be exposed to attack in the flank and rear by such craft debouching from the Ems, wherefore the mouth of this river must be closely watched by a blockading enemy. Similarly the left wing will be threatened with attack of torpedo vessels from the Eider. Mines will be planted outside the bay.

There is to be taken into account, moreover, the general inclemency of the climate, the prevailing strong westerly winds often accompanied by rain or snow, and the frequent fogs; further the dangerous nature of the coasts.

The blockading service is therefore likely to be connected with great losses and to be exceedingly wearing both to the personnel and the matériel. The need of an advanced base will be strongly felt.

Turning now to the Baltic, we find in the western part the great naval port *Kiel,* in the eastern part the navy yard at Danzig.

From Kiel the North Sea, and hence the ocean, can be reached, not only by way of the canal, but also by way of the Danish waters. The navigation goes through the three international channels, which connect the Baltic with the Kattegat, viz., the Sound, the Great Belt and the Little Belt, and thence through Kattegat and Skagerak to the North Sea. See Plate IV.

Of these channels only the Great Belt can be passed by large ships, in the modern sense of this term, and is in fact to be considered the military highway between the Baltic and the Kattegat. The Great Belt is, however, difficult to navigate for large ships, and like the two other channels it may be easily mined or controlled by submarine boats and torpedo-boats.

Also the Kattegat presents considerable difficulties to the navigation of large ships, which, under many circumstances, have to move with great caution, and hence become liable to submarine attack of various kinds in the presence of an enemy.

These difficulties of the Danish waters, inherent in the hydrographical conditions, are, however, of great advantage to Germany on account of the nearness of these waters to Kiel. In fact, as long as no other power has obtained a foothold in the Danish waters, and as long as Denmark remains neutral, they can easily be controlled by the German Navy.

The Skagerak is 60 miles wide at its narrowest part and is difficult to blockade or even to watch effectively. It is deep and free from shoals, it cannot be mined, and a high speed can be maintained in navigating it, whereby the dangers of submarine boats may be eliminated.

Once the Skagerak is passed, the distance to the ocean is relatively short and the navigation simple. Hence it may be said that the Skagerak, considered as a gateway to the ocean, is much more direct and less dangerous to pass than the Helgoland Bay. Likewise, and for the same reasons, Skagerak is better adapted than the Helgoland Bay for making sorties or raids into the North Sea, whether with large or small forces.

3. *English Naval Bases on the North Sea.* (See Plate IV.)

The development of the Helgoland Bay as the principal center for the German Navy has had its counterpart in a concentration by England of her naval strength in the Home Fleet, and in an effort to station this fleet more and more on the North Sea.

A naval port has been built at Dover at a cost of about eighteen million dollars, and a new base is being formed at Rosyth on the Forth. While Dover, which is practically without dockyard facilities, is to be considered chiefly a port of assembly and refuge, it appears to be the intention in course of time to make Rosyth a base of the same rank as Portsmouth. The station as now planned is, however, according to press reports, on a more modest scale, and comprises only one large dock, which is to be ready for use in 1914, while the entire station is said not to be completed before 1918. Recently it has been decided to build two more docks at Rosyth.

The principal base on the East Coast is still Chatham—Sheerness with its extensive dockyard facilities. At Harwich is found a base for torpedo craft.

At all the important harbors on the East Coast fortifications are found, which in combination with submarine boats will pro-

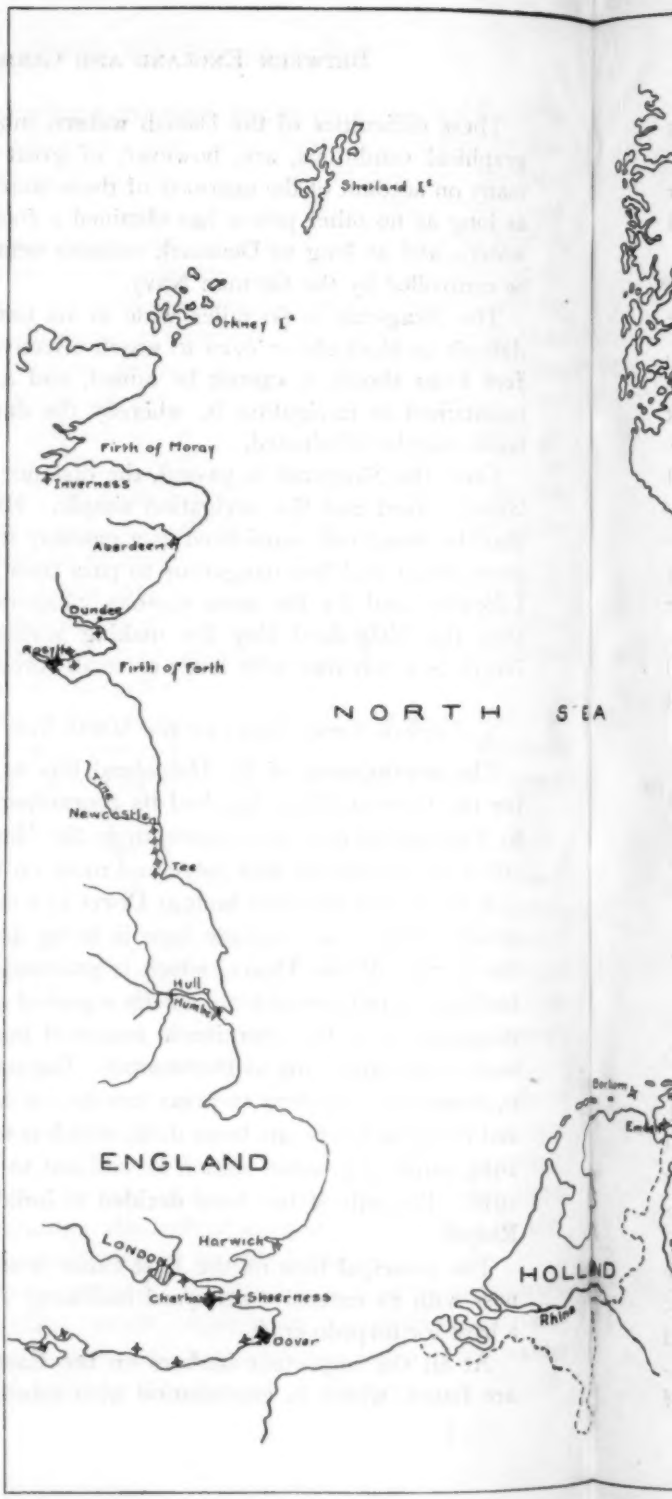

Shetland Is.
Orkney Is.
Firth of Moray
Inverness
Aberdeen
Dundee
Firth of Forth
NORTH SEA
Tyne
Newcastle
Tee
Hull
Humber
ENGLAND
LONDON
Harwich
Sheerness
Dover
HOLLAND
Rhine

PLATE IV

NORWAY
Kristiansand
Lindesnæs
SKAGERAK
SWEDEN
Skagen
Frederikshavn
KATTEGAT
DENMARK
Jutland
Esbjerg
Great Belt
Zealand
COPENHAGEN
The Sound
Little Belt
Fyen
Smaland
Falster
BALTIC
Amrum
Kiel
Helgoland
Cuxhaven
Brunsbüttel
Wilhelms haven
Bremer haven
HAMBURG
Ems-Jade Canal
BREMEN
Elbe
GERMANY
HOLLAND
Rhine

vide ample security against attack as long as the English fleet is in being. Moreover, these harbors will probably be used as temporary stations for cruisers and destroyers, and will thus never lack protection. The immediate protection of the coast need therefore not influence the choice of location of naval bases.

Rosyth is particularly well located as a base for the English main force in a war with Germany, since the Forth is about the same distance, 375 miles, from Helgoland and from the Skagerak, and the navigation from the Forth to these two places is perfectly clear and simple. Chatham and Dover are indeed somewhat nearer to Helgoland, but are considerably farther away from the Skagerak, and the navigation from these ports is anything but simple for large ships, especially in foggy weather. While, therefore, torpedo-boats, submarines and all the vessels directly employed in the blockade of Helgoland Bay would naturally have their base in Dover, Sheerness, Harwich and other ports on the East Coast, the gros of the fleet might, with advantage, be concentrated on the Forth and only seek Chatham or the Channel ports when necessary for repair. Stationed on the Forth, the fleet would be less exposed to attack by German submarines and torpedo-boats than would be the case in the Southern ports, which are nearer Borkum, and which are situated in waters more favorable to the navigation of such craft. The fact that large ships, stationed on Rosyth, are able to go at high speed as soon as they are outside the port, would reduce very much the danger from attack by submarines.

Whether the Forth with Rosyth, possibly in conjunction with other Scotch fjords, will be able, in a near future, to give safe anchorage and harbor space to the entire English main fleet with complete protection against submarine attack, seems, however, doubtful. Perhaps it will be necessary for the fleet to concentrate in the less advantageous positions on the Nore and in the Channel.

A base at *Scapa Flow* in the Orkneys has been proposed; it would flank the northern outlets of the North Sea, but would be of importance only if a close blockade of the German coasts could not be carried out.

A *canal between the Forth and the Clyde,* navigable for large ships, would, under the same circumstances, be of great strategic value, and has been the subject of much discussion. In would put Rosyth in direct and safe communication with the great shipbuilding district of the Clyde; it would afford a covered line of

connection between the Channel ports and the Forth, and would in general procure the advantage of "interior lines" between the East and West Coast.

4. *Technical Progress.*

The *increase in size and draft* of ships of all types, which has taken place in recent years, has greatly restricted the field of action of modern fleets, especially in such waters as the approaches to the Baltic and the southern part of the North Sea. It has made navigation in such waters more difficult and therewith enhanced the danger of all forms of submarine attack, and in particular of submarine boats.

It is not accidental that the growth in the size of large vessels has been accompanied by a very forced development of the submarine boat. The two movements are indeed correlative, since the increase in size of capital ships has, at least partly, for its object to render them more resistive to submarine attack, while the very increase in size and cost of individual ships has greatly stimulated the development of submarine boats.

The submarine boat is now recognized as a necessary link of the naval force, useful for defensive and under certain circumstances also for offensive purposes. Recent large types of submarine boats are capable of navigating everywhere in the North Sea under all conditions of weather. Thus the German boats U_3 and U_4 have, in November, 1909, made the voyage from Cuxhaven round Skagen to Kiel, 540 miles, in 40 hours, *i. e.*, at an average speed of 12½ knots. The boats had no escort.

Technically then, *i. e.*, as far as seaworthiness and endurance are concerned, there is no difficulty in sending submarine boats from one side of the North Sea to the other, and while they may not be suited for cruising about or for attacking ships independently in the open sea, it does appear possible to station them for some time off the port of an enemy. In the daytime they will remain submerged, keeping lookout intermittently through periscope, and being ready to seize any chance of attack; during night time they will keep connection with the atmosphere and if necessary replenish their store of electricity.

The submarine boats may thus take up advanced positions at the entrance to the enemy's ports and may at times even attempt attacks in these ports or roadsteads themselves.

The success of such offensive use of the submarine boats must, however, largely depend on the strategical situation. Thus the submarine boats of a blockading fleet have the advantage that they run no danger till they approach the port of the enemy. When on their blockading station, they may, whenever found necessary, fall back on the advanced torpedo vessels and scouts, from which they may obtain fresh crews and supplies, or, if the weather is too rough, they may be towed into shelter.

It is clear that such service will be very exhausting for the personnel, but, even if not kept up continuously, such submarine blockade will have good chances of inflicting actual damage on the enemy, and cannot fail to produce a great moral effect. The weaker power, if blockaded, may indeed likewise send submarine boats to the enemy's ports, but the risk of discovery before they reach such ports will be much greater, and relief and assistance cannot so easily be obtained. Hence the endurance of the boats will be very limited, and the service will be intermittent and extremely hazardous.

On the other hand, submarine boats will be of great value to the blockaded part in the defence of home coasts and ports. The blockading vessels will be exposed to unexpected attacks by such craft, and may be forced to keep at a greater distance from the blockaded port than formerly.

Already in the Russo-Japanese War, where submarine boats were not used, the gros of the blockading fleet was ordinarily stationed in a well-protected advanced base, where it was safe from the attack of torpedo-boats. It did not, as in old days, cruise about in front of the enemy's port, but came out, in fact, only when called upon to meet the enemy's battleships, or to protect landing expeditions. The immediate blockade or watch was carried out by means of torpedo vessels and a few cruisers.

After the advent of the submarine boat this mode of warfare, the so-called "base strategy," which has been much facilitated by the development of the wireless telegraphy, will, no doubt, be followed even more rigorously. The harbor where the main fleet is stationed must, in future, be guarded and protected by special means against all forms of submarine attack; the fleet will not go out unless its action is urgently needed, and great precautions will be taken when going in and out of port. The blockading capital ships will hardly ever go as near the enemy's naval ports as did the Japanese battleships, with such fatal results, when they were used

for a close blockade of Port Arthur in order to protect the landing of the II Army.

II. STRATEGICAL CONDITIONS DURING THE WAR.

1. *England and Germany at War, Neither Being Supported by Other Powers.*

We shall commence by considering *the time up to the end of 1914*. After that year the Kaiser Wilhelm-Canal, as well as the new naval station at Brunsbüttel, will probably be completed. The harbor of Helgoland and the dock at Rosyth will be ready. Moreover, we know fairly definitely what the additions to the two navies of capital ships will be up to that time, while later development is impossible to predict. The great importance of the completion of the canal makes indeed the year 1914 or 1915 a turning point in the strategical relations of the two countries.

We have seen that the naval superiority of England as compared with Germany may at the present time be taken as three to one, steadily decreasing till at the end of 1914, when it is as about two to one, the superiority in "Dreadnoughts" being then as three to two. In view of this enormous difference in quantitative strength, we conclude that the war would essentially take the form of a blockade or masking of the German ports by the English. The object of the blockade would be:

1. To watch and report upon the movements of the German fleet, and to bring it to action.

2. To prevent the escape of commerce destroyers.

3. To prevent all trade on the German ports.

It would not be the immediate object of the blockade to prevent sorties of the German fleet, but only to secure and transmit such information about its movements as will enable the English main fleet to intercept it and to meet it with a superior force.

Let us consider first conditions in the *North Sea*. The English will undoubtedly keep their main fleet assembled at one base, whether in the northern or the southern part of the North Sea, if necessary, distributed in several ports or roadsteads so close together that an actual concentration can always be effected before meeting the enemy.

The first immediate duty of the English fleet will, according to the foregoing, be a close watch, and a blockade of the Helgoland Bay and of the Skagerak. This we imagine to be carried

out in the following way: Submarine boats are sent into the Helgoland Bay and stationed at the estuaries of the rivers. Attempts will be made to obstruct the channels by mines, and to block the harbor of Helgoland.

Destroyers keep going outside the bay and off Borkum, ready to report any movements of German warships, and ready to intercept merchant vessels, which might attempt to break the blockade. The line to be watched, extending from Amrum to Borkum, is of about 90 miles length, but destroyers would probably take up more advanced positions. Similarly, destroyers, with base on the Scotch or northern English coast, will watch the Skagerak.

Behind these lookout vessels are found scouts and other light cruisers distributed so as to form support for the destroyers and connecting links with the battle fleet. Armored cruisers are distributed in accordance with their speed and fighting power, partly as direct support for the lighter ships, partly as reserves in the rear.

The detailed distribution of the blockading vessels, as well as their tactical formation, shall not be discussed here, these features being considered outside the scope of this essay, but it may be taken for granted that the whole North Sea would be kept under surveillance.

The battle fleet remains at its base, as effectively protected against submarine attack as possible, but ready to go out on short notice, whenever German sorties in force are reported.

It is not likely that the efficient and enthusiastic German Navy would remain passive when subject to such a blockade.

From *the Helgoland Bay* cruisers and torpedo-boats would try to escape and would attack the blockading vessels and perhaps the shipping in the North Sea.

Cruisers attempting to reach the ocean would, as explained above, in most cases be intercepted.

Submarine boats might break through the blockading lines at any time, but would in the open sea have poor chances of success against the English ships, which would always be moving at a safe speed. Expeditions to the English coast must be carried out chiefly in surface condition, across a sea closely watched by the enemy, and would, as explained above, be very liable to failure. Probably the most advanced blockading vessels and boats would suffer most from the attack of submarines.

As to the main fleet, it seems unlikely that the Germans should risk a decisive action in view of the overwhelming superiority of the English. Most likely the Germans would try to wear out the enemy by frequent sorties, undertaken with the object of surprising and overwhelming detached vessels or smaller squadrons. The time and radius of operation of the German ships must, however, always be limited as long as they want to avoid the English battle fleet. Attacks on English ports or landing expeditions on the English coast appear to be entirely out of the question under these circumstances.

Since the nearest point of the English coast is more than 200 miles from the blockading line the need of *an advanced base*, for repair and for replenishing bunkers and stores, would undoubtedly be strongly felt by the English. Especially the destroyers and the submarine boats would need an advanced point of refuge.

The best point for this purpose would be the island of Helgoland, but this island could hardly be reduced and captured without undue sacrifices. The German North Sea islands, even if they offer any suitable harbor, would be very difficult to hold, and points on the mainland are for the same reason entirely out of the question.

Outside the German coast we find to the north an excellent point of refuge in the Danish port of Esbjerg, close to the German frontier, but here again the English would soon be driven out by the Germans if the Danes prove incapable of preventing a landing. Similarly, points in Holland, even on the Frisian Islands, would probably be difficult to keep. In either case there would be an infringement of the neutrality of one of these countries with the attendant political complications, being a positive violation of the agreements of the North Sea Conference in Berlin, 1908.

It is therefore likely that England will accept the drawbacks accompanying the great distance between the blockading lines and their bases. These drawbacks are in fact not so great now as only a few years ago on account of the general increase in size of all classes of vessels, including destroyers and submarine boats, and on account of the advent of wireless telegraphy, but, with an enemy so energetic and well equipped as in the present case, it seems likely that the blockading service will be very strenuous and connected with considerable losses.

Let us next consider conditions in *the Baltic and in the Danish*

waters. If the English limit themselves to a blockade of the Skagerak, *i. e.,* if they do not penetrate into the Kattegat, they must be prepared to see German ships and torpedo-boats break through quite frequently. Cruisers, armored and unarmored, would have good chances of reaching the ocean and might thus threaten the English trade routes, although it must be admitted that in these days of wireless telegraphy such ships, having no base outside Germany on which to fall back, would be in a very perilous position. The English vessels and torpedo-boats, patrolling the North Sea, would be liable to continuous attacks, and since they would probably be somewhat scattered, while the German ships might perform concentrated offensive thrusts, the result of such engagements might often be fatal to the English.

Again, in this case, it would be highly desirable for the English to possess an advanced base. A port in Norway, near Lindesnæs, such as Kristiansand, would for this purpose be ideal, but could not be obtained without breaking the guaranteed neutrality of this country. The seizure of a port in Norway by the English would, moreover, probably be followed by the seizure of ports in Jutland such as Skagen and Frederikshavn, by the Germans.

If we suppose the German "Dreadnoughts" to be stationed in Wilhelmshaven, a concentration of the German fleet in the Baltic could not be effected, and only the earlier battleships could make sorties through the Skagerak.

On the whole, then, we may expect the English to remain in control of the North Sea, but the frequent raids of German cruisers into the ocean, and the constant disturbances by sorties of German armored and unarmored ships into the North Sea would soon become intolerable to the English, and make it desirable for them to carry out a more effective blockade than is possible in the Skagerak. This could only be done by pushing the blockading lines farther forward, into the Kattegat or even through the Belt and the Sound into the Baltic. The Germans would, however, here, as pointed out above, be in a more advantageous position than the English, because they would be so much nearer to their base. Notably the German submarines would act under much more favorable conditions than the English, and also mines could be used with great effect. Hence the English could send armored ships into these waters only at the greatest risk, while detached cruisers and torpedo vessels would run great danger of being cut off or overwhelmed.

The only way in which England could overcome this difficulty and place herself on an equal footing with Germany in the Baltic, would be by establishing *an advanced naval base in the Danish waters.*

The best location of such a base would be on the eastern shores of the Great Belt, which channel, as stated above, is the highway between the Kattegat and the Baltic, and which, moreover, debouches on Kiel Bay. Another more retired base is found in the Danish capital, Copenhagen, on the Sound, which place, being fortified and provided with a good harbor and dockyard facilities, would form an excellent port of repair and supply for the fleet. Copenhagen would at the same time form a good base for a blockade of the eastern part of the German coast on the Baltic.

The possession of the former base implies indeed with necessity the possession of the latter, since no position on the shores of Zealand could be securely held against the will of the Danish government without control of the whole island and in particular of Copenhagen.

From these two bases the English might thus blockade Kielerhaven and the entire German sea-coast on the Baltic, and they could not be driven away from Zealand as long as they were in control of the surrounding waters.

In pushing through the Kattegat and the Great Belt the English would probably meet with a determined resistance from the German fleet, which could consist, however, of only Pre-Dreadnoughts, since the Canal cannot be passed by Dreadnoughts. To meet such a force the English might detach a superior squadron of similar ships, without unduly weakening their main fleet in the North Sea.

Even after the German battleships and cruisers were driven back on Kiel, there would still remain a danger of losses from the attack of submarine boats and mines. To this must be added the resistance which the English fleet would meet from Denmark, the moment it tries to seize upon a base in strictly Danish waters. In order to gauge this resistance, we must consider the probable political attitude of Denmark and the condition of its national defence.

It is the declared policy of Denmark to remain neutral under all conditions, and there is every reason to believe that Denmark would oppose with armed force, to the utmost of its ability, any infringement of its neutrality, whoever might be the aggressor.

The problem of the defence is in Denmark one of peculiar difficulty, because the territory is by the Great Belt divided into two parts, each of which has to be defended separately, if the navy is not in control of this channel.

The defence of the western portion, Jutland and Fyen, is necessarily weak, since the army must be mainly concentrated on Zealand as the most important part of the country, and since there are no fortified positions in the western part of the kingdom on which the army can fall back. In fact, if the aggressor is Germany, the resistance which can be offered will be relatively insignificant. If England is the aggressor, the case is somewhat better for the Danish forces, since the English Army must then effect a landing, which is always a somewhat delicate operation. Should such a landing be attempted, and should the Danish forces prove incapable of preventing it, it is likely that the Germans would step in. In view of the overwhelming superiority of the German Army it is indeed very unlikely that the English should attempt a landing in Jutland, as long as the German forces are not engaged elsewhere.

The eastern portion of the kingdom, Zealand, with adjacent islands, comprising the capital, is placed under entirely different strategic conditions, since it is capable of a naval defence. As the Danish waters are particularly well adapted to the use of mines and torpedo vessels of all kinds, this defence may be made very effective. The first and most important line of defence is therefore formed by the navy.

The Danish Navy consists at present of four small armorclads, a number of torpedo-boats, mostly of older date and one small submarine, suitable only for harbor defence. The mine defence is fairly well developed.

The armorclads, although incapable of fighting first-class battleships and of resisting submarine attack, will be useful against hostile cruisers and torpedo vessels and as support for own torpedo-boats and submarines.

According to the bill of national defence of 1909 there are to be 24 torpedo-boats and submarines, and several such boats, among which two submarines, are now under construction.

The only base of the navy is Copenhagen, which place, according to the new bill of defence, will soon be fairly well protected on the sea front. Thus the main force of the fleet will be free to take up an advanced position on the Great Belt for defending the

neutrality of this channel, and for maintaining the connection between Fyen and Zealand.

The position most suitable for this purpose is a bay between the islands Zealand and Laaland, called *the Smaaland Sea,* which is now being provided with fortifications at various points. The Smaaland Sea is undoubtedly the best position for controlling the Belt, and it is of particular importance that the Danish naval force should entrench itself here, because it is at the same time the position most likely to be coveted as an advanced base by a power, which, like England, might desire to blockade Kielerhaven.

The second line of defence is the coast of Zealand, where the navy and the field army may cooperate in opposing landing expeditions of an enemy. Since the Danish ships and torpedo-boats are easily overwhelmed by a great naval power, submarine boats would here be of particular value, but, as appears from the foregoing statements, Denmark is at present very poor in this class of vessel. The mine defence is alone likely to cause any serious difficulty to the enemy.

The total strength of the Danish Army is about 80,000 men when fully mobilized, with a field artillery of 96 guns of modern type, but a part of this force may be stationed in Jutland and Fyen, while another part will be tied to the defence of Copenhagen.

The third line of defence consists in the fortifications round Copenhagen. Copenhagen cannot be considered a fortress as far as the defence towards the land front is concerned; in fact the place has here more the character of an intrenched camp or fortified position on which the field army can fall back.

The resistance which can be offered by the second and third lines of defence is, from the point of view of a great power, only small, and can be estimated with tolerable certainty beforehand, but the resistance which may be offered by the first line, the navy, if properly developed, is of an entirely different order.

We need consider only the fate of the battleships *Petropawlowsk, Hatsuse* and *Yashima* to realize the risks incurred by vessels operating in hostile waters suitable for mine laying, as are the Danish waters in an eminent degree. The advent of the submarine boat has greatly added to these risks.

All that is needed in order to make the naval defence of Zealand a serious obstacle even to a great power is a further development of the mine defence and the acquisition of a number of submarine boats.

We shall now return to the discussion of an English occupation of an advanced naval base on the Great Belt and of Copenhagen. We assume then, that as the first step in this operation the English have succeeded in driving back the Baltic division of the German fleet into Kielerhaven, and that they have seized upon the Smaaland Sea, overcoming the resistance which they would here meet from the Danish Navy. If this base is to be held in safety, we have seen that it will be necessary for the English to take possession of Zealand and of Copenhagen. The existence of the Danish field army will force the English to land a very considerable expeditionary force, which will require a large tonnage for its transportation.

As explained above, the resistance which the Danish Navy can offer at present to the landing of such an expedition will not be serious.

German submarines will perhaps constitute the gravest menace to an English landing expedition, but these boats, having no base in Danish waters, will not be in so favorable a position as would be Danish submarines stationed at the various Danish harbors and fjords.

Points on the coast of Zealand can be found where the landing of troops can take place under the guns of the ships in perfect safety against the attack of the Danish Army. A force, superior to any which the Danes can put in the field, can be landed, and the Danish Army can be driven back on Copenhagen. After further reinforcements and siege guns have arrived, the fall of this city will only be a question of time.

Although the operation must be admitted to present very serious risks and difficulties, it seems perfectly feasible under the present circumstances, and would perhaps be carried out by a coup-de-main at the beginning of the war.

If then the English succeed in establishing themselves on Zealand they will be absolute masters in the North Sea and the Baltic and will be able to carry on an effective blockade of the entire German coast.

The occupation of Zealand by England would probably be followed by an occupation by Germany of Jutland and Fyen as a countermove. The Germans would hereby obtain control of the western shores of the Great Belt and the Kattegat and might thus, under many circumstances, be able to disturb the English line of communication. It is not unlikely that in such case the English

would contest the German occupation of Fyen, which might thus become the scene of serious fighting.

An occupation of Zealand by Germany, anticipating the action of England, would hardly be attempted as long as the Germans have no assured control of the Danish waters, and if such control were established, the occupation would have no object.

We shall next consider the case where *the war takes place during or after* 1915, when the works on the Kaiser Wilhelm-Canal will have been completed. Let us suppose that the increase in capital ships of the two navies after 1914 is as indicated on Plate I. The situation during the years 1915-20, will then be gradually improving for Germany, for at the end of that period her strength in "Dreadnoughts" will be about as three to five, while the preponderance in "Pre-Dreadnoughts," which England possesses at present, will be reduced and will lose more and more in significance (see Table and Plate II).

Germany will now be able to concentrate her entire fleet in either the North Sea or the Baltic as desired, and it will not be safe or wise for England to attempt the seizure of a base in Danish waters, since this would necessitate the division of her fleet into halves, which could not on short notice mutually support each other. Such a move could indeed not be contemplated by England, unless the German main fleet had been first defeated. England must therefore, as far as the Baltic is concerned, limit herself to a blockade of the Skagerak, and will be in the position already described above, where her trade is liable to suffer serious disturbances, and where she will have to face frequent offensive blows from the German Navy. The Germans would in this case, as mentioned before, need a base in the northern part of Jutland, just as the English would need a base in Norway, but the resistance which these small countries are able to offer to such violation of their neutrality, would no doubt first be seriously considered.

In actions between the main fleets the English have a reasonable prospect of defeating the Germans, although hardly without suffering serious losses themselves. Where the difference in strength is not greater than here assumed towards the year 1920, it is not safe, however, to rely too much upon numerical comparisons, even if full allowance is given for the high standing of the British Navy. Unless the war is brought to an early end by pressure from other powers or by internal or colonial difficulties, it is

quite likely to be of long duration. In a protracted war the resources of the two countries for the construction of ships, guns, armor and other war material would play a most important part and would no doubt be strained to the utmost. The rate of construction of Dreadnoughts in peace time has been estimated to be eleven for England and eight for Germany per two years. The final issue might thus come to depend on which country would first become economically exhausted.

Even if the English fleet were defeated, there would, however, be no probability of a German invasion into England. Such an operation would require an assured control of the North Sea, which Germany could not expect to obtain, especially in these days of submarine boats. If a landing should be attempted and successfully accomplished, the line of communication would be liable to interruption, and it is believed, that in view of the strength of the English Army as well as the resolution and resourcefulness of the English nation, the life of such an expedition would be very short.

Before attempting to form any general conclusion, it is necessary to complete the mental sketch which has here been drawn by considering briefly *the trade and food supply* of the two countries during the war.

According to the so-called "Declaration of London," adopted by the International Naval Conference, held in London, 1908-09, *all goods, excepting absolute contraband of war, destined to one of the belligerents, are exempt from capture by an enemy if carried in neutral bottoms and documented for discharge in neutral ports.* This rule includes not only raw materials and manufactured articles which are susceptible of use for peace purposes only, but also so-called *conditional contraband of war, i. e.,* articles susceptible of use in war as well as for purposes of peace. Foodstuffs, fuel, etc., belong to this category. Such *conditional contraband carried by a neutral ship is, on the other hand, under many circumstances, liable to capture when documented for discharge in enemy port.*

It is easy to show that in a war between Germany and England these rules are as favorable to Germany as they are unfavorable to England, on account of the peculiar geographical conditions of these two countries.

Holland, Belgium and Denmark form the chief gateways through which, under this rule, raw materials and foodstuffs

carried in neutral or even English bottoms may flow into Germany, and through which German manufactured goods may be exported to all parts of the world. Holland, in particular, is favorably situated for such trade, having excellent connection by waterway right into the heart of Germany.

England, on the other hand, is not contiguous to any neutral country, and according to Article 34 of the Declaration neutral ships carrying conditional contraband of war to English ports will be liable to capture by German warships in the following cases:

1. If consigned directly to any department of the British Government.

2. If consigned to a trader, who is known to have delivered goods of the kind in question to the British Government.

3. If consigned to any British fortified place.

4. If consigned to any place which serves as a base of operation or supply for the British Army or Navy.

It is seen that this article is so vague as to permit of a very broad definition. Thus practically any port of importance in the United Kingdom, and indeed in the British Empire, may, according to (3) and (4), be interpreted to fall under this rule.

Moreover, according to Article 49, neutral vessels are, when thus captured, liable, in "exceptional" cases, to be destroyed, viz., when the warship cannot bring it into port without involving danger to itself. This contingency, which in the case of German warships is likely to be the rule rather than the exception, will, of course, greatly increase the insurance premium in such trade.

It follows, for instance, that a neutral ship carrying wheat, which is on the way to Germany via Rotterdam, cannot be captured by English warships, even if the wheat is destined to the German Army or Navy, while the same ship, carrying wheat to England, will, in most cases, be liable to capture or even destruction by German warships.

Thus Germany may obtain food supplies not only by land but also by sea with perfect security, while the supply of foodstuffs to England, which to this country is an absolute necessity, will be liable to serious interruption, if any German cruisers are abroad.

It is in this connection of great interest to note that at the London Conference the British government proposed certain re-

strictions in *the rights of belligerents to convert merchant vessels into warships on the high seas,* but the delegates of the other powers refused to attach any condition or limitation to this principle. Thus, at the outbreak of the war, Germany may convert a number of her merchant ships into auxiliary cruisers, if before the war she has provided them with arms and ammunition. Such conversion may, of course, also take place later during the war.

England has not, at the time these lines are written, ratified the rules of this Conference. Since the main object of the Conference was to frame rules for the guidance of a new international prize court, and since agreement was not obtained on all the questions raised by the British government, the basis for the establishment of such a court is not complete. Since, moreever, the rules agreed upon have met with bitter opposition from several sides in England, it does not seem certain that this ratification will take place.

We have seen that *if England succeeds in establishing herself on Zealand,* she is able to carry out a complete and effective blockade of all German ports, naval and commercial. Hence German shipping will be in that case completely paralyzed from the beginning of the war. All over the world German merchant vessels will be laid up, inactive as during a great strike. The German colonies may be occupied by England, and German shipping will be largely supplanted by English.

If England accedes to the rules of the London Conference, the industry and commerce of Germany will, however, largely go on as in time of peace, and the food supply will not be seriously disturbed. German merchant ships converted into auxiliary cruisers will at once from the beginning of the war prey upon English shipping, and German cruisers breaking the blockade may from time to time cause disturbances in English trade, but it seems likely that all such vessels, being without any base, would soon be hunted down or driven into port by the English cruisers. Thus on the whole the shipping and food supply, the trade and the industry of England would, under these circumstances, hardly suffer any serious disturbance. The interruption in mutual trade relations which the two warring countries would suffer would of course in any case cause great losses to both nations.

If, on the other hand, *the English have no advanced base in the Baltic,* as is likely to be the case if the war takes place after the work on the Kaiser Wilhelm-Canal is completed, we have seen

that German cruisers will probably break the blockade in Skagerak quite frequently. In such case English shipping, trade and food supply may be seriously disturbed. Prices on foodstuffs may rise sharply and panics may be caused. At the same time the German trade in the Baltic and in Danish waters may be carried on as in time of peace, and the great Danish export of foodstuffs, which ordinarily goes to England, will be diverted into Germany.

On the whole, if England adheres to the rules of the London Conference, the economic life of Germany will not be deeply affected in either case. If, on the other hand, England does not ratify these rules, she may, if she chooses, consider as absolute contraband all the articles specified by the Conference as conditional contraband, and by giving a broad definition to the list of articles so specified, she may most seriously hamper the food supply, as well as the trade and industry of Germany. In this case not only the shipping, but also the trade and industry of England will flourish at the expense of those of Germany.

2. *England allied with France at War with Germany.*

Referring to the foregoing discussion, the naval situation on the North Sea and the Baltic will in this case only be changed in as much as the inferiority of the German Navy will now be more marked. The probability of an occupation of Zealand will therefore be greater than if England stood alone against Germany.

By establishing themselves on Zealand the Allies would not only be able to blockade Kiel and the German coast on the Baltic, but would also pave the way for a diversion from the north, should such a move be found opportune. The mere possibility of such a diversion would tie a part of the German Army in the defence of Kielerhaven and would force Germany to undertake a strong occupation of Jutland and Fyen.

The main issue of the war would be determined on the continent, and would depend chiefly on the strength of the expeditionary force, which England could send to the support of France.

Should the Germans be victorious, they might take possession of the French Channel ports, but as long as the Allies were in control of the sea, Germany would be as incapable of invading England as was Napoleon in 1805.

3. *A Great European War.*

We shall only consider the case where the powers of the Triple Entente, England, France and Russia, are at war with the two powers of the Dreibund, Germany, Austria, while Italy may or may not be supposed to take part in the war.

While the French Navy may be partly or wholly engaged in the Mediterranean, the Russian Baltic fleet will be available. The balance of naval power in the North Sea and the Baltic will be strongly in favor of England and her Allies, and it is again extremely likely that these powers will attempt to seize Zealand so as to be able to control the Great Belt and to blockade Kiel effectively.

Again in this case the issue of the war would be determined on shore.

SUMMARY AND CONCLUSIONS.

It has been shown that in the event of the war taking place before 1915, Germany will be at a great disadvantage in a single-handed conflict with England. Her colonies will be occupied, her entire coast line will be blockaded, and her shipping paralyzed. If England does not tie herself by a ratification of the rules of the London Conference, the trade, the industry, and the food supply of Germany are liable to suffer most serious interruption, while the commerce and industry of England will prosper almost in the same measure as those of Germany decline. Thus England may exert a great economic pressure on Germany, and this latter country will be practically unable to retaliate. On the other hand, England is incapable of directly inflicting any vital injury upon Germany, for the perfect coast defence of this country and the great military power behind it render it safe against all shore attack. The English will probably attempt to establish a base on Zealand, in which case the Germans are likely to occupy Jutland and, perhaps, Fyen.

The outcome will depend on how long Germany will be able to sustain this throttling of her economic life.

In the event of England adhering to the rules of the London Conference, Germany will probably be capable of a more prolonged resistance. Political conditions and events, internal or external, may of course force the warring nations to an early peace, but otherwise Germany may gain time for a material increase in

naval strength by new construction, as well as for the completion of the Canal. The English will then be liable to be driven out of the Baltic and the Danish waters, Zealand will be captured by the Germans, and the war will enter into a different phase.

After the completion of the Kaiser Wilhelm-Canal, Germany will be in a much better strategical position. Provided the growth of the two navies is as assumed in the foregoing and as indicated in Plates I and II, the relative strength of Germany will be gradually improving till the time when her naval program is completed.

Towards the end of the period 1915-20 the disparity in strength will not in fact be so very great, and it seems quite possible that the war may be carried on with varying success. Moreover, many other factors, besides numerical strength and success in battle, may influence the final outcome of the war. Even if England is victorious and even if she has fully maintained her present naval superiority, it seems certain that her trade and food supply will suffer interruption and that she will experience heavy losses. It is likely that the war will be carried to the point of exhaustion of one of the parties, both countries putting forth their utmost efforts in military operations as well as in repair and renewal of their matériel.

An exclusively naval war must rely for its issue ultimately on economical exhaustion, and is likely, under the circumstances here discussed, to be either inconclusive or else very protracted. The warring nations can in fact only apply a part of their resources and forces in the conflict, since their armies cannot be brought into action, and the most powerful form of coercion, that of territorial occupation following the defeat of the hostile army, cannot be employed.

In the event of fighting between the two powers taking place on shore, whether on Zealand, Fyen or elsewhere, the war may, of course, acquire a much more intense character.

On the whole, a war between England and Germany alone, in the near future, whether before or after 1915, cannot be tempting to either party, but it must be admitted that events may happen, not to be foreseen and entirely outside the control of the two countries, which at any time may produce a conflict. Hence, it is necessary for the countries concerned, including adjacent small countries, to be fully prepared for war.

Holland and Denmark, which flank the German North Sea coast, will act as buffer States to the German Empire, as long as they are neutral. Holland will, in particular, cause the stress of the commercial blockade of the North Sea coast to be relieved, while Denmark will prevent a close blockade of the Baltic coast line. Thus, during a war with England, Germany is interested in respecting the neutrality of these countries, on condition, however, that their policy is strictly and impartially neutral, and that they are capable themselves of defending their neutrality.

If these conditions are not fulfilled, we have seen that these countries, and in particular Denmark, will constitute a danger to Germany, and their position will then be very critical.

It is therefore dangerous for these small countries to listen to the advice of the peace advocates, who recommend the easy and tempting course of disarmament. So long as the great powers have not disarmed, the small powers must be prepared to protect their neutrality and independence with armed force.

Denmark is indeed at present making great efforts for strengthening her national defence, but an addition of a considerable number of submarine boats should be made to the existing programme of the navy.

Unless Denmark is well prepared to defend her neutrality, in particular on the sea, she will run great risks of seeing her territory invaded by the belligerents in spite of the most earnest and impartial policy of neutrality on her part. Denmark will then become a second Manchuria, a battleground for foreign armies and navies, and even the integrity and independence of the country may be jeopardized.

Holland is militarily much stronger and, as appears from the foregoing, not in quite so dangerous a position as Denmark.

As to the probability of France or other powers taking part in the conflict, and as to the probable outcome of the war in such case, no opinion shall here be expressed. The strategic conditions in the North Sea and the Baltic would, however, probably be essentially of the same order as during a war between England and Germany alone.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

COMPETITION *VS.* CHARACTER.

By LIEUT.-COMMANDER LYMAN A. COTTEN, U. S. Navy.

Of recent years, in our navy, competition has become the power of powers. It is no new thing, as we shall see, but it has been put to new uses, and has grown and spread until it permeates the naval atmosphere and largely dominates naval thought. Many look upon competition almost as a sacred institution: the open sesame to all achievement and success, without which every desirable naval quality would languish and die. To these the mere questioning of the value of competition will seem as nothing less than high treason. When a thing gets to be too sacred for criticism, it is very safe to presume that it is sadly in need of it. If criticism be well merited, then it must surely serve a useful purpose; if it be without merit, it falls away from its subject, leaving it all the brighter in the clarified atmosphere.

The following is not an indictment against competition of itself, but a few simple reasons are herein gathered together, to show the fallacies of competition run riot, and to point out some of the attendant dangers of uncurbed competition, that at times degenerates into a veritable orgy of competition. It is a plea for safe and sane competition under control and restraint, and at the same time a plea for some of those immensurable things that go to make up the ideal leader, and are believed to be unfavorably affected by competition as it now exists in our service. Also what follows is believed to fairly represent the ideas of a large and rapidly increasing number of officers, and therefore entitled at least to careful consideration.

Let us first briefly look into the condition that led to the adaptation of competition as the great healer of our modern navy. Forty years of unbroken peace prior to the Spanish-American War had seen our navy reduced, at one time, almost to a con-

dition of inutility, and certainly to a condition of woeful inadequacy. True, such duties as came in peace were well done, but the insidious teachings of peace led to false standards and erroneous conceptions. Preparedness for war, the sole justification for the existence of a navy, was lost sight of in the pleasanter pursuits of peace. Our navy became essentially a show navy, and our ships were scattered in small and heterogeneous groups to the four corners of the earth. Showing the flag became the acknowledged function of our ships, and the appearance of a ship was the generally accepted measure of her efficiency. A long unbroken state of peace, with no actual prospect of war, usually plays havoc with the rugged military virtues, and warps the good judgment necessary to the proper perspective of professional matters. It is feared that during this long period of peace our service often worshipped false gods, and judged itself by artificial standards. The requirements of *peace* were well met, and complacency and self-satisfaction grew and thrived.

The war with Spain but tended in a large part to confirm self-satisfaction, for its results were surely of a satisfactory nature from a naval standpoint, though it must be confessed that we were blessed with an enemy only more steeped in the false standards of peace than we were.

After the Spanish-American War, our government took a step unprecedented in our national history. It had been a time-honored custom of our country, at the conclusion of each war in which it had been engaged, to reduce and curtail the navy and army, the weapons by which the war had been brought to a more or less successful termination, until they remained but skeletons of what they had been. After the war with Spain, however, both branches of our military force were largely increased, due no doubt to our increased responsibilities through having become a colonial power, and to the insurrection in the Philippines.

Now it was that certain ones, in the service, of keener perception or more analytical turn of mind, began to sound a note of warning that soon was heard throughout the navy. Here a weakness was pointed out, there a conceit was punctured, and louder and more insistent became the cry of warning, that would not down however much it were flouted. Gradually the truth dawned that the war efficiency of our navy was at low ebb and through indifference and self-satisfaction tending to get lower.

Then came the search with zeal and energy for the remedy, and all honor must be given to those that brought forward as the revivifier, competition, for whatever else may be said of it, it did arouse interest and remove lassitude. It is charged in China that frequently, during a particularly healthful season in a city, the coffin guild will have rats infected with bubonic plague introduced to *stimulate their business.* Unquestionably it accomplishes its object, though doubtless rather depressing in other ways. Has competition proved an unmixed blessing to our service, or has it introduced an infection with it? That is what we wish to look into.

When a doctor finds a patient weak and low in vitality he often prescribes a violent stimulant. Our patient, the navy, was most noticeably weak in that prime essential of war efficiency, gunnery, and the "gun-doctors" prescribed a violent stimulant, competition.

Almost immediately the patient began to show signs of renewed vigor. Lassitude was replaced by interest and improvement crowded upon the heels of intelligent endeavor. It has ever been the desire of a great many of those belonging to the profession of arms to find some cure-all for the weaknesses to which their profession is prone; some sure and certain nostrum to insure success in war. Seeing the first invigorating effect of the application of competition to gunnery, a large number of officers straightway seized upon competition as the long-sought nostrum and henceforth it became the guiding genius of our navy, and the spirit of competition was disseminated through its every branch.

Let us see what this great cure-all is that we term competition, and that seems of recent years to have become woven into such an integral part of the fabric of our naval being. Whence came it and what is its history? Are its associations and influences good, bad or indifferent? These, and other things, it behooves us to look into well and earnestly, for surely competition has become a power. As we understand the term, competition may be defined as "a striving to win," and the degree of success is measured not in actual accomplishment, but in relative standing of all competitors. Thus by gradation an attempt is made to determine the relative efficiency of all the competitors in the subject in competition, whereas what is really determined is the relative

degrees of success of the different competitors in the *elements entering into the competition.* For example, at our Naval Academy, the midshipmen of a class throughout the course are in competition, each with the other. The academic board awards a weight to mathematics, another weight to ordnance, to practical navigation, and so on through all the different branches. The total of each midshipman represents his standing in his class, but *not* necessarily his efficiency as an officer. It is perfectly well recognized that a good officer is about as likely to come from the foot of a class as from its head, for many of the intangible attributes that go to make up the good officer cannot be graded in competition. We are developing the material elements in competition, but at the expense of more important elements not in competition. We are letting competition run riot and retarding the development of character—that moral force without which wars cannot be won, however perfect the war material may be.

Competition is nothing new, for records of its many forms have come down to us from earliest times. It is not necessary, however, to search ancient history to learn the effect of competition on character. In our colleges and universities of the present day competition has been developed to a degree probably never exceeded. In its relation to college students we may learn something of its effects, and also the opinions of many learned men as to what they consider its effects to have been.

Until comparatively recent years it was the custom of most of our colleges to grade their students according to proficiency in each study. In other words, each study became a competition, just as at present it is at the Naval Academy, and each student taking that study became a competitor for the prize of leading his class in relative standing. Now such gradation of students has generally ceased. A student may be graded "excellent" or "good" or "bad" in a study, but how excellent or good or bad is left undetermined. This change came about after the most mature and intimate thought and discussion by college authorities, because it was believed that the fierce competition engendered by the old system injuriously affected the development of character. The degree of excellence in a study was not in itself so much the object sought as the character built up through study. The intense rivalry due to competition often led to cheating, excessive and injurious "cramming" and various forms of unfair

and unworthy practices, and generally tended to lower the moral tone.

In college athletics we find very similar results. The desire to win in competition with teams representing other colleges quite submerged the real object of the game, and led to misrepresentation, deception, extravagance, roughness and brutality. Some colleges have absolutely prohibited intercollegiate contests, and all have hedged these contests about with many corrective rules.

It must be acknowledged that in colleges, at least, competition has not proved itself an unmixed blessing, and from analogy we might expect somewhat similar results in our service. In the first place, competition is no new thing in our navy. How long it has existed therein is not known, but certainly it reached a keen pitch among the sailing ships in the years subsequent to our civil war. Light yards and topgallant masts came down on the run, and " gil-guys " of almost human intelligence were developed. Some ships became so expert in competition that it was dangerous to touch anything without warning when the actual necessity arose.

So, after all, competition was no new thing discovered after the Spanish-American War. It was only rediscovered, and through rules made applicable to modern conditions, and put upon an official basis. It has always been recognized that competition to stimulate interest must be governed by such rules, and held under such conditions, as not to favor any participant at the expense of another. So, at this time, more or less elaborate rules governing *conditions* and *procedure* in competition were promulgated.

The sea is proverbially an uncertain element, and in order that competition may be fair, various forms of artificiality have to be introduced into the competitions, and sanctioned officially, for now our competitions differ from those of sailing-ship days in that they are official. Having introduced artificial conditions into the competitions, false deductions are drawn therefrom, false ideas of training encouraged and real preparation for real conditions thereby injuriously affected.

From the beginning of official competition the opinion has been generally held that anything not actually prohibited by the rules was permissible, thus, while holding to the letter of rules, in many cases violating their spirit. This, from time to time, led to elabo-

ration of rules, until the very rules themselves in some cases became a study of no mean proportions. Mere complication of rules in itself is of minor importance, but it tends to show the complexity of artificial conditions and the extent to which regulation has had to go. Every contingency that may arise has its corresponding rule, while umpires and observers check and cross-check each phase and each feature. No officer or man is longer expected or required to make correct report, except in so far as it is required by his checkers, for no unchecked report is taken into consideration. If this be necessary, then is the laborer not worthy of his hire, and character development is needed above all else.

The general effect of a stimulant is well known. If a reaction of constant intensity is desired, larger and larger quantities of the stimulant have to be administered, until, finally, it not only loses its power to stimulate, but actually depresses. Competition is unquestionably a stimulant, and avowedly so administered to our service, but it is feared that we are actually trying to keep our quondam patient alive by this stimulant. Louder and more insistent grows the cry for more and still more competition, and more and more neglected are the non-competitive features that enter into naval efficiency, until their very importance is forgotten and their utility denied. So fierce becomes the competition that frequently the *object* of the competition is lost sight of in the competition itself, thus making it the end rather than the means to an end. Competition develops the desire to win rather than the desire to excel, and with the desire to win at all hazards is also developed a tendency to trickery, imposition and subterfuge. It is not meant that this is general in our service, but the direction of the wind may be learned from the way the spray flies.

Official competition was first introduced into the service, as has been stated, in connection with gunnery, and in that branch it has reached its most violent development. Let us see how it works. As the time for target practice approaches, interest *in the competition* (not necessarily in gunnery) increases until all else is lost sight of in the one possessing idea of standing well. As our competition is conducted and emphasized, the desire to win is inordinately stimulated alike by the vanity of officers and the cupidity of men, until in many cases it becomes such a passion that erstwhile good judgment is so warped that prudence and discre-

tion are thrown to the winds. Small wonder that competition and accident have so frequently gone hand in hand.

As soon as the practice is over the artificially stimulated interest collapses like a punctured balloon, and the art of gunnery languishes until the approach of the next target practice. However, some of the *bad* results of too violent competition follow close upon the heels of target practice. Insinuations, jealousies, disputes and protests are belched forth *ad nauseam*. Some protest in relation to their own scores, and others, having exhausted every effort to pull themselves up, attempt, by protest, to pull some fellow competitor down. One ship protests because she had to fire too nearly in the direction that the sun bore; another because she had the wind from an unfavorable quarter; still another because her pointers were unadvantageously affected by being kept "standing by" for a few hours. Now these and many other protested conditions are but natural, and that they are looked upon as things to be avoided in practice only shows what artificiality obtains and is accepted as the standard. Of course, it is the duty of the tactician in actual battle to eliminate as far as may be within his power disadvantageous conditions, but surely the gunnery training should not preclude them, for they may be forced upon one by an adversary more highly skilled in the art of tactics, at which time good gunnery becomes all the more essential, since that alone may then serve to regain the lost advantage.

It is not alone the features that enter into competition that are affected by competition, for there is a decided reactionary effect upon the non-competitive features that go so far to make up real efficiency. The artificial stimulant competition, by directing an exorbitant amount of effort into competitive channels, withdraws it often from its natural and logical channel and retards development in the features not in competition.

It is very difficult to get every element that goes to make up war efficiency into competition, for many of them cannot be expressed in units of a standard, thus precluding exact gradation, the prime requisite of competition as at present applied in our service. This is particularly true of such elements as strategy, tactics and that fundamental upon which all war efficiency is so largely dependent, *moral force* or *character*. The material things may easily be arranged for competition. Thus the number of hits

per minute may be prescribed as the measure of gunnery efficiency; the coal and water and oil used, or the speed developed may be designated as the standard measurement of steam engineering efficiency; the money value of stores used may be taken as the measure of economical efficiency, but we can get no material standard by which we may measure degrees of proficiency in such intangible things as ability to command in its broadest sense, to lead or to inspire in subordinates that confidence so intimately associated with success in war. These things are largely based upon character or moral force, and this is not developed by our materialistic competitions, but is rather retarded by being apparently relegated to a place of lesser importance. In the wild scramble for success in competition our whole perspective becomes so warped that there is danger of our losing our ability to differentiate between essentials and non-essentials. The very roots of character formation are being contaminated by the virulent and noxious growths springing from competition.

The enlisted personnel of our service is in a constant state of change, and is replenished largely by young, impressionable and untrained men, and to a lesser degree the same is true of the commissioned personnel. These young men receive their most vivid impressions of the service through the competitions in which they take part. All stress is placed upon these competitions, *purely as competitions*, and everything else is relegated to the background of unimportance. Every appeal is made to vanity and cupidity, the twin foci of the ellipse of competition about which, as centers, so many of the evils of competition revolve. It is not surprising that one who does well in competition magnifies his own importance out of all proportion to the true case. He puffs himself up, much as does the star player upon some minor college team, until the very success of the team is held in his hand and subject to his every caprice. He holds himself to be superior to his fellows, and not subject to ordinary rules and regulations. The indispensable man should not be tolerated aboard ship, and a man, though qualified through competition, may thereby be *ruined* as a military asset.

That a gun pointer, for example, should do the best of which he is capable, regardless of competition, is not among the precepts taught to-day. That it is his duty to do his best, and he is ordered by his officers to do so, and it is right that he should do

so, and his responsibility demands that he do so, are, it is feared, unheard-of dicta to the present-day pointers, and but meaningless phrases to the young officers. Unquestioning obedience and staunch loyalty, the foundation stones of all true discipline, are being undermined to such an extent that, if it continues to go as of recent years, ere long officers and men will undertake aught not pertaining to some competition only when, where and as they see fit, or at least only at the very earnest solicitation of their responsible seniors. The performance of duty not relating to competition is often most perfunctory, and if perchance it should interfere (or be thought to interfere) with preparation for a competition, it is resented as being untimely, unfair and inopportune, however important in itself the duty may be. Competition is so emphasized that in the minds of many young officers and men nothing else is of any importance.

For more than 10 years now we have happily been blessed with peace, but we must beware of the false teachings and unsound standards of peace, now as ever. During our last long period of peace our standard in material things wandered far from the naval ideal, but through all this period of peace, ideals of duty, of character and moral force were clung to, and despite our weakness in many respects we passed safely through the trial of war. The pendulum is swinging the other way during this period of peace, and we are concentrating more upon material things, but let us not lose sight of the actual military value of character. Competition was officially introduced into the service shortly after the close of a war as an aid to the preparation for war, but it has been allowed, even encouraged, to run riot, and may by its very intensity have defeated its own object.

If the reasoning herein set forth is true, the remedy is apparent. Restrain and control competition. Make it serve as a means instead of an end. Do not sacrifice anything important to competition. Keep down artificiality. Do not attempt to grade all competitors with exactitude. If a ship be excellent in gunnery, or very good in steam engineering, it is quite enough that she know this, without attempting through some more or less artificial standard, to express to all just *how* excellent she is, or just *where* she comes among all those that are very good. Allow all the crew of an excellent ship to wear some badge of honor, as an E upon their sleeves or a colored cap ribbon, but do not attempt

to buy war efficiency with dollars and cents. If it be real it cannot be bought, and bogus efficiency but leads to a false sense of security. Above all else look to the development of character, for that is the great immensurable military quality that sustains in adversity, comforts in suffering, perseveres under discouragement, sacrifices self to duty, and will be in the future, as it has been in the past, ever associated with military success.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

EARLY DAYS IN JAPAN.

By CAPTAIN ARTHUR C. HANSARD.

Japan is supposed to have been first visited by the Portuguese as early as 1542, and it would appear that they managed to establish a strong trade with the country: then in the beginning of the seventeenth century the Dutch established a trading station at Nagasaki. The East India Company, in 1613, also established a depôt on a small island named Hirado, off the west coast of Kiushiu, under a Captain Siris, but he abandoned the post in 1623. A shipwrecked English sailor named Will Adams, of Limehouse, London, lived for many years at Yedo in the service of the Shogun or Tycoon, mainly as a shipwright and boat builder, and he died there in 1620. The Portuguese might have remained indefinitely had they not meddled in politics; they also introduced a new religion which made such rapid progress that tradition put the number of converts down at several millions during the first hundred years. The early religious propagandists were men of noble character, but they were soon followed by men of inferior qualities and the people began to suspect that the real object of this mission work was the subjugation of the country. At first the Portuguese were persecuted, then they were expelled, and the sins of the Portuguese were visited on all foreigners indiscriminately, access to the country being denied to all aliens alike, except a few Dutch who were allowed to remain at Nagasaki for trade purposes, under very humiliating conditions. Japan thus closed her doors to the nations of the West, and they remained so closed for two centuries and a half, when Commodore Perry, of the United States Navy, landed at Uraga with a letter from the President of his country, and secured the promise of a treaty. Many vessels visited the islands during the interval and attempts had been made to secure a footing in the country. There was an edict

prohibiting natives from leaving the islands and this law was strictly enforced. In 1870 a sister of the writer brought away from Japan the first native woman who was ever allowed to leave the country. Many natives who had chanced to be carried off in ships by which they had been saved when shipwrecked in their own junks were not permitted to return until after the formal opening of the country to commerce in 1854. Many of these men, on their return, could not speak their native language, but as they soon picked it up they became of great service to the State, mostly as interpreters and in other capacities.

Prior to 1868 there may be said to have been two rulers in the country. The Ten-shi, or Mikado as he is more commonly known to Europeans, the real head of the Empire, lived in semi-sacred seclusion at Kioto, whilst the Shogun or Tycoon lived at Yedo where he was the virtual ruler and head of the government as the Ten-shi's deputy. The position of Shogun was hereditary just as was that of the Emperor himself, but from having held the position for so many centuries they claimed absolute power and freedom of action without any reference to the Ten-shi, and that he was the executive head of the State. In 1862 the Shogun was cited by the Emperor to appear at Kioto; he did not go at that time, but later on, when he did go, it was admitted that he was only a vassal of the Ten-shi, and this was undoubtedly the beginning of the end of the rule of the Shoguns, the complete overthrow being accomplished in 1868.

As there were two rulers it is but natural that there should be two political parties and on the coming of the foreigners these parties ranged themselves under two very distinct banners. One was the Jo-I, who sought the expulsion of the foreigner and the continued seclusion of Japan, the others called the Kai-koru whose main policy was progress and the opening of the country to western methods; feeling between the two parties ran high and was very marked. Eventually the Jo-I became the O-Sei, in opposition to the Bak-fu or military curtain government, by which was virtually meant the rule of the Shogunate. All who were opposed to the prevailing system of government ranged themselves under the banner of the O-Sei, not necessarily thereby opposing themselves to the foreigner, and when the cry of expulsion had served its purpose the leaders of that party were quite willing that it should cease to exist, and it may be said with perfect truth that

many of Japan's foremost statesmen of after years were at one time allied with the O-Sei organization, yet we know they all stood for progress and advancement. The cry of the O-Sei was "the expulsion of the alien" but its real ambitions were "Down with the Shogunate."

Shimadzu, Prince of Satsuma, and Mori, Lord of Cho-shiu, the two most powerful daimios or nobles at the southern end of Japan had formed a league for "the expulsion of the barbarians and the restoration of the Ten-shi to full control," but the feudal system flourished and the Shogun was at the height of his power and every daimio owned allegiance to the Emperor's deputy at Yedo. The country was, however, far advanced in those revolutionary troubles preparatory to the crisis which had been surely coming for the past hundred years, but which was accelerated by the presence of the foreigner, whose coming had disturbed an elaborate political machinery. The Civil War of 1868, under which the dual system, feudalism and the "curtain government" of the Shogun were to pass forever, had really begun, though foreigners who did not know Japan supposed it was simply the revolt of two great feudal daimios from their suzerain and that it was simply a quarrel between Satsuma and Mori on the one side and the Shogun on the other.

When Commodore Perry landed at Uraga, as already stated, the villagers were filled with consternation, as no direct communication had been held with the outside world for over 230 years and it was in direct contravention of the laws of the Shogun to hold any communication with foreigners. The head man of the village undertook to have the letter forwarded to the ruler of the country and the commodore obtained the promise of a treaty at some future time; this was obtained during the following year. The advent of this foreign officer during such an unsettled state of the country served but to accentuate the difficulty of the position of the Shogun and his party, for if he yielded to the demand of the President of the United States as contained in the letter, that the country should emerge from its self-imposed seclusion and allow foreigners to enter within its gates, he would incur the wrath of the nobility, or at least a certain part of them, whilst if he refused he might find his country facing a hostile invasion and perhaps become an India or a China, which would be quite as disastrous to himself as forcing the exclusion of the foreigner. So

he took the counsel of men who advocated the making of treaties with people whom Japan was not, at that time, strong enough to effectively exclude, and thus was inserted the thin edge of the wedge—at first nothing more than a promise of friendship—between the United States of America and Japan, but it was the thin edge, for very shortly afterwards a treaty was negotiated which granted the right to establish a legation at Shimadzu, a small town on the Idzu peninsula, some sixty-five miles southwest of Kanagawa. In 1858, Lord Elgin concluded a treaty granting rights to establish legations in Yedo, but as feeling was running very high against the foreigners it was eventually agreed that they should be settled at Yokohama, a small village close to Kanagawa, but off the main road connecting the two ancient capitals. Our relations with Japan in those early days were very disturbed, as the party opposed to foreign intercourse was powerful and truculent.

In 1861 an armed force of ronins attacked the British legation in the middle of the night, killing and wounding many of the inmates. These "ronins" were armed bands going about the country making attacks on foreigners; they had mostly been retainers of some great feudal lord who had now become adventurers, rather than mercenaries, drifting with the political current of the hour.

Anxieties were further multiplied for the Baku-fu party when, in 1862, the Ten-shi sent an envoy to Yedo to require the Shogun to proceed to Kioto, there to discuss the political situation and concert measures with the other great nobles of the land for the expulsion of foreigners. Shimadzu, a Prince of Satsuma, and uncle of the head of the house of Satsuma, undertook personally to proceed to Yedo to escort the Imperial Envoy or Viceroy to and from Kioto, and proceeded there with six hundred of his clansmen. He had other ambitious objects in making the journey, but it is only necessary now to state that he completely failed in all. He was treated in Yedo with coldness and hauteur, and on that fateful September 14 he left Yedo with all his followers and commenced his long journey down the Tokaido, or great road, that connects the two capitals, passes through Kanagawa and within a short distance of Yokohama: it may readily be understood that he was not in the best of good moods as he travelled homewards. It so happened that on that same day a party of

English, some visitors from China and others, merchants from Yokohama, and consisting of Mrs. Borrodaile and Messrs. Richardson, Marshall and Clarke were riding along this same road within treaty limits. At first they met the usual crowds, then the advanced party of the noble's guard, and then that of the prince himself, seated in a palanquin. In Japan, when a great noble passes it is the rule to give a clear road and to make obeisance, but this pleasure party was either little versed in the customs of the country or else they were somewhat arrogant, for they went riding on taking no notice whatever of the great man who was passing. When close to the palanquin of the prince, Mr. Richardson was cut down by a Japanese sword and his body hacked to pieces. Mrs. Borrodaile narrowly escaped death, by the opportune falling of her hair, which was cut. Mr. Marshall lost an arm, and Mr. Clarke managed to escape, though hotly attacked. News of the occurrence soon reached Yokohama and a small force of blue-jackets and men from the minister's escort went out to the scene of the disaster to bring in the body. The writer was one of this party and well remembers the scowls and evil looks on the faces of the natives he met, but the prince's party had already passed and no further attack was made. Colonel Neale, British chargé d'affaires, in the absence of Sir Rutherford Alcock, called on the Shogun's government for the punishment of the murderer and compensation to the victims. After prolonged negotiations the Japanese alleged—and we now know that they simply stated what was the truth—that they were powerless to coerce the Prince of Satsuma in his distant dominions; so Admiral Kuper and the British fleet took the matter in hand and in August of the following year a considerable squadron left Yokohama for Kegoshima, the capital of the Satsuma territory, situated at the extreme south of the Empire. An ultimatum was sent ashore requiring the execution of the murderer of Mr. Richardson, in the presence of the British officers, together with the payment of compensation to the relatives of the murdered man and the victims, the amount being fixed at £25,000. This was refused and the Japanese did not wait for the fleet to open fire, but took the initiative themselves, and with unquestionable courage and skill. The admiral immediately seized and destroyed three steamers belonging to the prince and bombarded the town. A fire broke out, which, owing to a typhoon blowing at the time, destroyed

more than half the town. The fleet drew off and the Yedo government paid the fine.

The writer arrived at Yokohama in the spring of 1861 from Tien-tsin, where he had been frozen in on the Pei-ho River for four months, at the close of the China War of 1860, so that he was in good time to be in the thick of all the anti-foreign troubles in Japan. The occurrences at Kegoshima were made the subject of a debate in the House of Commons, when Sir Rutherford Alcock was entirely sustained in the retaliatory measures he had pursued. But the debates and the occurrences together were, in an indirect way, the cause of two midshipmen leaving the navy. It is a curious coincidence that they both entered the army, one meeting a soldier's death in Zululand, the other being the writer.

Shimadzu has been referred to as the uncle of the head of the house of Satsuma, but some little explanation is required for this. The previous daimio was Shimadzu's brother, and he adopted the then young ruling prince as his son and it followed under Japanese law that the father became uncle to his own child, so that Shimadzu was the father and nominally the uncle of Satsuma; hence the reason for his being so prominent in the affairs of his country at this period.

It is somewhat important that the geographical position of Cho-siu and Kiu-shiu be fully understood to be able to follow the events of the next year or more in Japan. The Empire consists of four principal islands: in the far north is Yeso, which may be eliminated from this article, as it does not play any part in the episodes; next comes Hondo, by far the largest of the group and it may be considered the mainland; the capital is situated on the east coast of this island: then Shikoku, which is, as it were, jammed in sideways and under the instep of a foot formed by the southern end of Hondo: finally comes Kiu-shiu which is separated from Hondo by the narrow Straits of Shimonoseki. The Ten-shi or Mikado's capital at Kioto is also situated on Hondo, in the middle of the instep referred to. The Satsuma family held sway in Kiu-shiu and Mori was lord in Cho-shiu, which is situated on that part of Hondo which stretches down to the Straits of Shimonoseki: therefore the Lord of Cho-shiu on the north and Satsuma on the south held the straits. Well realizing the strength of his position, Mori opposed the passage of foreign vessels entering the straits from the west and Satsuma took sides

with him and the two thus became involved with the Baku-fu, *i. e.*, the Shogun, concerning the right of way. Mori signified his disapproval by firing on ships attempting the passage. The Baku-fu had failed to convince him that the channel ought to be open to all comers, and despairing of its own ability to put a stop to the systematic interference with foreign shipping, had authorized the admirals of the western powers to take such measures as they thought best.

June 25, 1863, was the day fixed for the expulsion of the "barbarians" and on that same date the American merchant vessel *Pembroke*, having a pilot furnished by the Yedo government, was on its way through the straits, and was fired on by the land batteries and the guns of the armed brig *Ko-sei*, formerly the *Lanric*, but was not damaged. Thus the peace of centuries was broken. On July 8, the French despatch boat *Kien Chang* was hit in several places. A boat was lowered to enquire the reason for such an attack, but a well-directed shot immediately sank her and nearly all the crew were killed or drowned, the vessel herself being saved by a lively use of the pumps. Three days later the Dutch frigate *Medusa* was hit thirty-one times, seven shots piercing the hull and three 8-inch shells bursting on board: four men were killed and several wounded. On the 20th of the same month the French gunboat *Tancrede*, though steaming rapidly through the channel, was struck three times before she got through. Then, not long after that, a steamer belonging to Satsuma was mistaken for an alien vessel and was fired upon; she was set on fire by the shells and sunk, twenty-six Japanese losing their lives. There was ample proof that the Cho-siu artillerists had learned their lesson well, and they were in high glee over their successes. They believed that with their armed brig, their bark (formerly the *Daniel Webster*), and an iron steamer of 600 tons named the *Koshin*, formerly the *Lancefield*, they could lick creation. What most astonished the Hollanders on the *Medusa* was the projectile, such size and weight being undreamed of; to find 6- and 8-inch shell exploding on their deck was a novelty to the Dutchmen in the Eastern world and showed that the Japanese were up to the times. The American sloop *Wyoming*, under the command of Commander McDougal, was the next to retaliate on the hostile clansmen, but as I am in hope that this article will be read by officers of the American Navy, who have just cause to be proud

of the deeds of McDougal and the crew of the *Wyoming*, I will make a special chapter of that engagement; moreover, I am not dealing with the deeds of a single foreign nation just here.

The French ships *Tancrede* and *Semiramis* then went out to punish the war-like holders of the passage for their attack on the *Tancrede*. They subjected Shimonoseki and did considerable damage, but here again the Japanese displayed good gunnery and courage. Next, a combined fleet comprising British, French and Dutch vessels steamed out from Yokohama and the battle of Shimonoseki of 1864 was fought. The Americans had no warship in those waters at the time to represent them, so they sent out an unarmed chartered vessel, but she took no active part in the engagement.

The British contingent consisted of nine ships of various sizes: There was Admiral Kuper's flagship, the *Conqueror*, 101 guns and to which the writer belonged, the frigate *Eurylus*, 51 guns, the corvette *Barrosa*, 22 guns, *Tartar*, 20 guns, paddle sloop *Leopard*, 18 guns, *Bouncer* and *Coquette*, 4 guns each, and the paddle sloop *Argus* with 6 guns, also the *Perseus*. The French sent five ships and the Dutch four, the *Medusa* being one of that number. As was the custom amongst British middies when anything exciting was on in those days, I managed to get a little fun out of the fight as well as the excitement: burnt powder was not new to several of the other midshipmen on the same ship as myself, for we had been present at the attack on and taking of the Tanku and Taku Forts, at the mouth of the Pei-ho River in 1860, and some of us had been up to the sacred city of Pekin. Of the battle itself there is little enough to be said. The vessels of the various powers took up their allotted position just out of the strong current, and early the next morning prepared for the assault. Not without warning, however, for due notice had been given of the intention. The Cho-shiu batteries were eight in number, the first being three miles to the east of the town of Shimonoseki, thence extending up to the hill opposite Moji Point where the main street of the town begins. In all, there were mounted some seventy-five guns in these batteries, and the instant that the guns of the ships opened fire a most lively response was made by the Japanese gunners. The most powerful of the Cho-shiu guns were mounted at a small village half way between the town of Shimonoseki and another village named Cho-fu.

After some pretty severe fighting, in the course of which the town caught fire and burned fiercely, the batteries were silenced and some blue-jackets were landed to aid in extinguishing the fire. The natives were not all armed with firearms as one sailor on the *Tancrede* was killed by an arrow. After the surrender of the forts was completed, a document was drawn up for Mori's signature, agreeing to certain conditions under which the allied squadron should retire: the document was duly signed and returned after two days, and the guns from the batteries were taken on board the fleet which then drew off. An indemnity of £600,000 was eventually paid, irrespective of the amount claimed by and paid to the owners of the American ship *Pembroke* which, as already stated, had been fired on. Of course the loss of the guns put a stop to the firing on vessels passing through the straits. Though the Cho-shiu men were very proud of the resistance they had made against so many vessels, they have not forgotten the behavior of the British in landing a party to assist in extinguishing the conflagration which the fighting had caused. The French lost three men killed and the Cho-shiu had between fifty and sixty men killed and many wounded.

The act of Cho-shiu in firing upon the foreign vessels marked the beginning, not only of a foreign war and "The first deed of arms in Japan" as it has been called by a native historian, it marked also the beginning of a civil war and a long political struggle which was to end only with the revolution in 1868. For all that, Japan had not failed to properly learn the lesson she was taught from the fighting with the foreigners. She learned the lesson and she immediately set to work to profit by it. At the time when dissensions between the two parties were at their height the Shogun, being only fifteen years old, was not able to lend any assistance to his party; Shimadzu, acting for his nephew (son) the Prince of Satsuma, exerted all his influence to reconcile the conflicting interests of the contending factions, but without avail, and matters were in this condition when the Shogun decided to proceed to Kioto in answer to the summons he had received from the Ten-shi during the previous year; there was a half-hearted reconciliation between the ruler and his viceroy or deputy and for the moment harmonious relations were re-established. But a personal quarrel occurred between the Shogun and Mori, Lord of Cho-shiu, which would have been much more serious

for the Shogun had Satsuma been quite ready to throw in his lot with Mori. As it was it ended disastrously for Mori, who was sent down to his own dominions by the Emperor, and the Shogun remained in favor. The Cho-shiu clan was from that time directly and openly opposed to the Shogun's party and were so indignant at the insult thus put upon their lord that they marched to Kioto and attacked it. In the fight that ensued the clansmen were opposed by the troops of the Shogun, who had been directed by the Emperor to punish Mori for the outrage, and at the same time Mori was deposed by edict of the Emperor. But Mori and his men cared little for either Emperor or Shogun and raised the standard of revolt in the west of Japan. Then, at the head of a numerous army, he set out again for Kioto where he met the troops of the Shogun in a series of engagements which ended in the Shogun's defeat. This was fatal to the Shogunate, for whilst it is true that he had already made the admission of vassalage to the Ten-shi, that was simply an admission that the power of the Shogun had its limits. Satsuma had failed to support Mori, but that did not indicate for a moment that he supported the Shogun, and by this time some of the more powerful of the provincial daimios had fallen away from their allegiance to the Shogun and had ceased to attend the court at Yedo, or even reside there during the prescribed six months in each year. The whole country between Kioto and Yedo now became infested with ronins, outlaws by choice, adventurers by nature, men who had become freelances for the sole purpose of not involving their daimios in trouble on account of their actions, and it was perfectly unsafe for single persons or even small parties of foreigners to go out riding beyond the limits of the town, even within the treaty limits. Within a very brief space of time several assassinations took place, including Major Baldwin and Lieut. Bird, of the British regiment stationed on the Bluff, of Mr. Hueksen or Heutsen, of the British legation; of an officer of the French 101st Line Regiment, and of several others. The chapter is a painful one in the history of Japan and she has so long repented for the misdeeds of a few of her misguided people and as these misdeeds certainly did not have the approval of either party in the country at that time, it would certainly be nothing but generous of the English to say little to remind the Japanese of it.

Matters were going along in this way till the early part of

August, 1865, when the flagship of Admiral Kuper was ordered away from Japan, and on the 12th of that month the writer set sail on that ship from Yokohama Bay on his way to lands far distant. We had not been under way very long till we met our old friend, the *Argus*—already referred to as being with us at the bombardment of Shimonoseki—she had mail for us which was soon transferred, and once more we had a look at the place where the batteries had proudly, or should I say arrogantly, defied the foreign "barbarian." And thus ended my period of service in Japan, and in fact in Eastern waters, but I was certainly there during the stirring days when history was in the making, and history has seldom been made in "the piping times of peace."

JULY 16, 1863. AN EPISODE.

In the previous pages an attempt has been made to tell of events in Japan leading up to the summer of 1863 when, according to the decree of the Shogun or Tycoon, the "hairy barbarian" was to be expelled, and Mori, the powerful daimio of Cho-shiu attempted to bar the passage of foreign vessels through the Straits of Shimonoseki by firing on them. June 25 was the date set for the carrying out of that decree, and on that day Mori was provided with exactly what he wanted to enable him to carry out his part in the program, for during the afternoon the American merchant vessel *Pembroke* entered the straits on her way to Nagasaki and China, having on board a pilot that had been supplied by the Yedo government: she was fired on by the land batteries, also by the guns of the armed brig *Ko-sei*, but escaped unhurt. Thus the peace of two centuries and a half was broken. In April of that same year Commander McDougal, of the U. S. Navy, in command of the *Wyoming*, was in Hong Kong looking for trouble, in the shape of a Confederate privateer; he received orders from Mr. Pruyn, the United States Minister in Yokohama, to bring his ship to that port, and to have her guns ready for service as the Japanese were beginning to give trouble to foreigners. Incendiarism and assassination on the part of the "ronin" were on the increase and, as a matter of fact, the U. S. legation was burned very shortly after the arrival in port of the *Wyoming*, but whether by accident or design, could never be found out. On July 11 Commander McDougal heard from his minister the news of the firing on the *Pembroke* on the 25th of the previous month, the

news having come up from Shanghai, and he was glad enough that Mori had provided an immediate substitute for an *Alabama*. Nothing daunted by the fact that he was not acquainted with the passage of the straits, neither could he obtain any chart of the place, he ordered coal on board and procured two pilots from the government; then he lost no time in sailing out to Shimonoseki.

The *Wyoming* was a sloop of war of 700 tons; she carried four 32-pounder side guns and two 11-inch Dalhgren pivot guns. She carried a crew of 160 officers and men, all of whom seemed "fit," and they composed a really good crew. The writer was the very first to board the *Wyoming* on her arrival in Yokohama, carrying a message from Admiral Kuper, and he had many opportunities of revisiting the ship during her stay in port, becoming very intimate with most of the officers and forming a great liking for and mutual friendship with that kindly old gentleman and thorough sailor, Commander McDougal. It is on account of this friendship and the intimacy with the other officers that enabled him to get a true account of the "episode" at first hand and quite ungarnished, and from having visited the scene of the action, he felt almost that he had seen the whole thing. As can be seen from a study of the accompanying sketch the Straits of Shimonoseki form the western gateway of the Inland Sea, the actual straits being about three miles long and from one and a half to two miles wide, but the navigable channel is only from three to seven hundred feet wide. The town consists principally of one long street running along at the foot of some bold bluffs, and there is a ravine in which the houses cluster pretty thickly; the population was, at that period, about fifteen or sixteen thousand persons. The batteries, or more correctly speaking, the redoubts or platforms where the seventy-four guns were mounted, extend from a point at the extreme east of the straits right up to the town itself; the village of Chofu, where the heaviest guns were mounted, being nearly in the middle of that line. There is also a ten-gun fort named Buzen on the opposite shore, but in such a position that it could not come into action against any ship that was attacking the town of Shimonoseki, facing some of the more easterly of the Cho-shiu redoubts. Amongst other guns on shore there were several 8-inch Dahlgrens which had been given to the government at Yedo, but in some way had got into Mori's hands. As well as the shore batteries, the Japanese had three vessels which have been described in a previous part of this narrative.

The *Wyoming* entered the narrow straits at 6 o'clock on the morning of July 16. Signal guns were fired from the first redoubt and passed along as far as the town. Before coming within sight of the town the first shot fired struck the ship above the engine room. No reply was made to any shot, however, till rounding the Monshi promontory on the southern shore, when the three ships and the whole town burst into view. Commander McDougal had taken care to ascertain the exact draft of the iron steamer already referred to, for he knew that where she could go

SHIMONOSEKI, SHOWING THE ROUTE OF THE U. S. S. WYOMING, JULY 16, 1863.

the *Wyoming* could follow. Stakes had been driven into the mud on the edges of the navigable channel and it was evident—even from the first shot fired—that the Japanese knew the exact distance and expected to blow the ship to smithereens. The steamer *Koshin* was lying close in under the forts and McDougal ordered the man at the wheel to steer direct for her as he intended to take her. The pilots got frightened and told him he would run his ship on shore as there was not enough water, and they were doing all they could to keep the vessel on the southern

shore: it was evident they were not accustomed to hear shot and shell flying about. As soon as the *Wyoming* was seen to be steering for the northern shore and the steamer, another battery, up the side of the hill, began to fire; this was one of the batteries that had an 8-inch Dahlgren. About then another battery also opened fire, and then was shown McDougal's wisdom in steaming out of the staked channel, as the shot now began to pass above the hull and up in the rigging. The three Japanese men of war carried eighteen guns between them. Even by this time, the *Wyoming* had several wounded and three killed. As the ship neared the Japanese vessels her flag was run up amidst ringing shouts and cheers, but was at once saluted from a fresh shore battery of four guns. By 10.30 a. m. the American vessel was in front of the town and dashed in between the steamer and the two brigs and was soon abreast of the *Ko-sei* which fired a broadside from her four brass 24-pounders. The *Koshin* was not able to do very much damage, her guns being pointed up the channel; but the brig was so close that the faces of her crew were plainly discernible, and the guns of the two ships were nearly touching each other. So rapidly did the Japanese work her guns that no less than three broadsides were fired before the *Wyoming* passed her. As she passed between the two Japanese ships she fired broadsides from both sides, and every shot found its billet. Now the inevitable happened; the *Wyoming* cleared the steamer and steered over towards the southern shore, and all the shore batteries getting the range again, together with the guns on the bark, concentrated their fire on her, and—she grounded—but despite that fact and the holes torn in her side by shells, she still vigorously continued firing: the *Koshin* had slipped her cable and made towards the shore under the batteries, either for the purpose of escaping or to attempt to ram and board the American ship. One of the brigs showed signs of distress and was evidently about to sink. But McDougal was not content to carry on the fight with his ship in the mud, so he set her propeller to work to get her off; fortunately this was a powerful one and after several attempts she floated again. The grounding took place close under the southern or Kiu-shiu shore in front of a village, and right opposite to the western extremity of the town of Shimonoseki. Ignoring the sinking brig, the *Wyoming* paid all her attention to the on-coming *Koshin*. In doing so she had to con-

tend with the swift running current. The bow chaser was the gun that proved of most service at this moment, as the broadsiders could not yet come into play; the bow gun, however, did its work well; the second shot passed through the vessel; it pierced her side just above the water-line, smashed the boiler, came out on the other side and exploded in the town half a mile away. Great volumes of steam rose from the disabled ship and spars and wreckage were hurled up in the air. The officers left the ship in rowing boats to pull for the shore and the crew jumped overboard to swim away, and the steamer sank from sight; at least forty of these men lost their lives. At this time the *Wyoming* was well past the town itself and had her work cut out to make way against the very powerful tide, as she had plenty of work before her yet: the bark was still firing as fast as she could serve the guns, and the guns in the batteries were finding their target. McDougal decided to settle the bark first and then give all his attention to the shore guns. The bark was soon disabled and worthless. On her way back the *Wyoming* dropped most of her shots right in the batteries, one of which was completely destroyed. Half an hour after noon the firing ceased, the *Wyoming* having fired from fifty to sixty shots in all, the enemy must have fired one hundred and thirty or more shots during the same time. The *Wyoming* lost five men killed and seven wounded: she was hulled ten times and her smokestack had six holes in it, her masts were injured and her rigging was pretty badly cut up. The Japanese lost two vessels sunk and the other disabled; one battery destroyed and many killed and wounded; the number of their casualties was never ascertained, as in Yokohama we were dependent on Yedo for information and the reports from there were erratic. There is no doubt whatever that the shore guns were well mounted, and the first idea that they were fixed so as to fire on the staked channel was soon found to be incorrect: the Japanese also fired a great variety of missiles, such for instance as round shot, shell, grape, canister and even chain-shot.

Honor and glory come to some men so easily and there is no doubt that McDougal was entitled to all the glory and honor he ever got for the part he played in the opening up of Dia Nipon. Perhaps had the United States not been busy attending to other matters nearer home at the time, McDougal would have had his services duly recognized, forgotten they certainly have not been.

During the engagement the *Wyoming* was under fire from three ships, and, at one time or another, of eight batteries and either one or two gun redoubts. Before she got through she sank two of the ships, made a lame duck of the third: she went aground and worked off again without aid, she disabled at least one of the batteries and silenced several of the others. She carried only six guns herself, but had opposed to her no less than ninety-two guns, some of which were heavy ordnance.

> When shall her glory fade?
> Think, think of the wild fight she waged!

For this little "episode" the United States collected $12,000, part of which went to the owners of the S. S. *Pembroke*.

On entering the harbor of Yokohama the following day, the *Wyoming* was greeted with ringing cheers from the *Conqueror* and other British war vessels as well as those of other nations then at anchor, and Admiral Kuper made haste to congratulate Commander McDougal. Very shortly afterwards, having made good her damages, the *Wyoming*, in compliance with orders she had received prior to coming to Japan at the urgent request of the U. S. Minister, left the East for home waters. She had the hearty good wishes of all who remained behind, and dozens of people lined the Bund to see her steam out. The writer, too, felt that he had lost a friend as she turned the point and sank from sight, but there has always been a lingering memory and pleasant recollections in his heart for as kind and good natured a friend as ever he had in his life in the person of David McDougal.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

ON THE DESIRABILITY OF A UNIFORM TYPE IN BATTLESHIPS.

By Rear-Admiral Caspar F. Goodrich, U. S. Navy.

A battleship may be called upon to fight a single-ship action; or she may fight an action as one unit in the fleet. If we could be certain in advance which of these rôles she is destined to fill, would this knowledge exert any material influence upon her design? In seeking the answer to this question I am led to a conclusion in the affirmative.

When acting alone, it is not to be doubted that she should be as powerful as possible in offensive and defensive qualities. The more guns and armor we can give her the better, together with a reasonable speed. Undue development of the last-named characteristic can only be secured at the sacrifice of protection or at the cost of excessive displacement; while the resulting superiority is of little value unless relatively so great as to appear abnormal. If the results of careful study on the part of thoughtful and competent men are to be accepted, this difference must not be less than 25 per cent; indeed, some of those best qualified to speak hold that this figure should be nearer 50 per cent.

It seems to me that the striving to produce battleships, each more formidable than its possible competitors, is a distinct adoption of the idea of the single-ship action as the keynote of naval policy on the part of the nation whose ship-building programme presents this unmistakable trait. This adoption will doubtless be denied, and with truth, so far as intent is concerned, but, practically, erroneously and against the logic of facts. The value of uniformity in battery command and in tactical properties, in such cases, goes unrecognized; the product is a collection of diverse types and not a homogeneous fleet. Such is our case to-day.

Everything in the mechanical world is a compromise. And this truism is especially applicable to ships' designs. As we cannot have all we want on a limited displacement, would it not be well to make up our minds to accept this disheartening and inexorable condition and take the broad view that to what the fleet needs the individual vessel should be subordinated? Here, again, I say "Yes"—although I am well aware that an opposite view may be strongly held, viz., that the strongest individual units must of necessity combine to make the strongest fleet. To this I am, of course, entirely ready to agree, provided these units be uniform in their attributes of offence, defence and maneuver—or if not absolutely uniform then fairly so. I do not care to impose too exacting conditions.

Again, if assured that the units of his fleet were reasonably alike in their ability to deliver and receive hostile blows, would not a commander-in-chief feel more confidence in his conduct of a battle when these units possessed identical maneuvering qualities than when they presented these qualities in quite discordant array? While I may be mistaken on this point, I hold, with considerable pertinacity, the view that homogeneity is what he would gladly have if not obliged to give up too much of the combatant powers—offence and defence.

The most important feature in a battleship's design is, unquestionably, the arrangement of the battery. After many experiments the axial line has come to be recognized as offering the maximum of advantages. To that disposition we are now, I had almost said irrevocably, committed. Holding fast to this basic idea, we have placed the third and succeeding turrets also along the ship's axis, and to secure unrestricted gun command the third and fourth turrets are installed on a somewhat higher plane than the others. All this is so reasonable that this, which may justly be termed the American scheme, has been adopted by other powers. If we place the fifth and sixth turrets in accordance with this principle, they will operate in a plane of their own, and we shall see our guns in three stories, as it were. That development we have not reached, doubtless for reasons of stability. Theoretically, it is the only proper way of mounting our battery—practically, we are forbidden to do so, and thus are driven to expedients which, in the cases of the *North Dakota* and the *Minas Geraes*, deprive some of the guns of their full value. To me it appears

fairly debatable whether we do not pay more in a number of disadvantages for this extra turret or so than they are really worth. If we require greater hitting power might not this be obtained by increasing the caliber of our guns and at the same time hold to the four turrets in two planes with all the incidental profits they offer?

Five or six turrets necessitate a much longer ship, for one thing, and a much greater area proportionally of surface to be protected. A glance at the designs of such vessels will show an enforced thinning of armor, especially above the water-line. Now, this is to run a great risk. As a general criticism applicable to all recent construction, I feel warranted in saying that insufficiency of protection is a universal characteristic. Wider armor belts and thicker casemates are imperatively necessary to give our ships the ability to receive as well as to deliver heavy blows. This ability may be defined as armor thick enough to keep out her own projectiles at the ranges to be expected on opening an engagement. By this I mean, not the proof butt normal impact penetration, but about two-thirds or three-fourths, since battle impacts will always be at an angle.

I refer, of course, only to those vital parts which must be protected at any cost. Tested by this old eighteenth-century rule, that "a ship is built to fight her fellow," all modern battleships, no matter what be the flag, will be found wanting. In my judgment, this state of things is serious. It can only be remedied by assigning of the displacement a larger fraction than is our custom to "protection"; and this remedy can be greatly facilitated by avoiding extreme lengths in the ship herself, and by frankly abandoning the fad of excessive speed.

The knotty problem of the right horse-power to provide might be attacked by considering the radius of action the ship should possess. Knowing the displacement, at least approximately, and thus having a pre-supposed number of tons available for coal and propelling machinery, it should be no difficult matter to divide this number into two parts, one for fuel, the other for engines, boilers, etc., and by the method of trial and error reach a conclusion that would enable the ship to cover the assigned distance at the maximum cruising speed. The weight of machinery thus determined would in turn fix the ultimate horse-power and the trial speed. Such a procedure would be logical—based on

strategic considerations—and so capable of defence in the forum of service discussion. Arbitrarily to demand some particular trial speed, or to support the demand by the plea that "the Persians are building battleships" with that particular speed is amusing rather than convincing. We should have what we want, but it is equally important that we should know why we want it. Our reasons ought not to display a simian imitativeness, but should be founded on strategic and tactical study, as interpreted by that greatest and sternest of teachers—history.

Would you have an example? Many of Rojesvenstky's ships had a nominal speed of 20 knots—and doubtless they made this rate on their trial trips. To secure it, their side armor had to be made thin. On the day of battle can it be doubted that he would gladly have exchanged the five extra knots which, by the way, he didn't have when the pinch came, for four or five more inches of armor on his casemates? If you bolt armor to a ship's side it is always there, but the high speed you have purchased by giving up some measure of protection may not be yours at the critical moment. A bearing may get hot—an auxiliary pump may fail—any one of a thousand things may happen to reduce your speed, but your power of resisting an enemy's shells is at its maximum at all times until weakened by his hammering. Had Rojesvenstky's ships possessed those extra inches on their casemates, instead of armor inadequate to keep out projectiles, and yet just stout enough to effectively explode them, it is conceivable that Togo might have failed.

Not only does the four-gun turret ship permit the adoption of greater protection, but it furthermore yields other incidental advantages—a capital platform for the torpedo defence guns; an ample space for the stowing of boats; a compact and convenient arrangement of the magazines and shell rooms; and the best possible provision for habitability.

A fifth turret introduces complications that are by no means insignificant. Its magazine is of necessity close to a fire room, thus calling for mechanical refrigeration. The structural problem, too, is not without its drawbacks. Relatively, the fifth turret demands more than its share of strength in meeting the strains and stresses on the hull, and it imposes an undue burden on the naval architect. These he has been able to deal with, I know, but after all, is what he gives us really worth while?

In spite of the lack of sufficient protection on their casemates, I think our *South Carolina* and *Michigan*, as a type, the best ever developed. Either of them is to-day more than a match for the *Dreadnought*. Why not stick to so excellent a design? If more battery power is required—is there any reason why three 12-inch guns each might not be placed in their lower turrets, or in all? If this is impracticable or undesirable, make her guns heavier, but never let us be diverted from that which is sound and good because other nations are groping in the dark and producing vessels that, in comparison with our simple and powerful *Michigan*, may not unfairly be termed freaks. It is time to call a halt on building single ships or ships in pairs, and to build fleets.

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AVIATION AND AEROPLANES.*

By CAPTAIN W. IRVING CHAMBERS, U. S. Navy.

THE MEET AT BELMONT PARK, N. Y.

At this tournament an opportunity was presented, for the first time in the United States, to view the latest Bleriot, Antoinette and Demoiselle monoplanes, perfected in France, in daily competition with the American biplanes of Wright and Curtiss and the French biplane of Farman. A Curtiss type biplane, belonging to Mr Hamilton, fitted with a 110 h. p. Hamilton motor, from which great speed was expected was also exhibited, but it made a poor showing at Belmont Park, due, it is said, primarily to an engine which refused to keep warm. It is recorded in the daily papers, however, that Mr. Hamilton has since made four miles in 3 minutes 1 second, with this machine at Memphis, Tenn., or the remarkable speed of 79.2 miles per hour.

A new model Curtiss machine attracted much interest. It was a small high power biplane, or rather a monoplane with a small upper plane over the driver. This was intended to defend the international cup that Mr. Glenn Curtiss had won in Europe, but unfortunately it left the ground for the first time after the cup race.

There was present also a curious, unclassified model of American design, in the hangar of Mr. Clifford Harman, which was not used. It consisted, principally, of a central cylinder about seven feet in diameter, placed horizontally, with single planes each side, the motor and propellers being located within the cylinder.

* A report of observations on *Aviation* and *Aeroplanes*, made in obedience to orders of October 21, November 1, and November 12, 1910, to attend the aviation tournaments at Belmont Park, N. Y., and Halethorpe, Md., and to direct an experiment in aerial flight from the U. S. S. *Birmingham;* including recommendations concerning the study and development of aviation in the Navy.

Two Americans at this meet, whose instruction in aviation had been received abroad, Mr. J. B. Moisant and Mr. J. Armstrong Drexel, drove monoplanes of the Bleriot type. Not one foreigner actually used a biplane, except the Englishman Mr. C. Grahame-White, who occasionally drove a Farman biplane. It is probable that he did this from choice, judging from the extensive use he had made of it during the previous meet here at Bennings, although the fact that his 50 h. p. Bleriot was wrecked at Bennings may have necessitated its use. It was a notable fact, however, that, in the gusty winds at Belmont Park, the biplanes were the first out each day and it was my impression that Mr. White preferred to use the biplane under those conditions in preference to a monoplane. Mr. White, however, at a late date used a high speed 100 h. p. Bleriot, which will be referred to later.

THE ADVANCE IN TWO YEARS.

It is recorded that, two years ago, when the Wright brothers and Farman were demonstrating the possibilities of flight in their biplanes, no ascensions were undertaken except during calm or perfect weather conditions, but the demonstrations at Belmont park and at Halethorpe were quite different. The weather was never ideal for flying. There was not a day during which the wind currents were not treacherous, and at Belmont Park there was only one very windy day during which the machines were kept in the sheds. Had this day not been Sunday, it is probable that some of the Wright biplanes would have flown. On the second day of the meet at Halethorpe a heavy downpour of rain, turning into hail and snow, accompanied by heavy winds, wrecked the large tents used as hangars and damaged two Curtiss biplanes beyond repair. It also caused damage, to a less extent, to the monoplanes of Radley, de Lesseps, Drexel and Latham, yet all of the monoplanes were soon repaired and flying in gusty winds with the Wright biplane, driven by Hoxsey, that had arrived after the destruction of the hangar. I gained the impression that repairs to these monoplanes were greatly facilitated by their method of construction, which permits the ready substitution of spare parts. Latham's Antoinette, for example, was slightly damaged in one of the planes, or wings, and a spare wing was quickly substituted. Radley's flier was badly smashed, but he had it in action before the end of the meet. It was not so imperative, however, to repair the Curtiss machines, as two others were readily sent to replace them.

THE PRINCIPAL EVENT AT BELMONT PARK.

The race for the Gordon-Bennet Cup, or *Coupe Internationale d'Aviation*, which by tacit consent of the various bodies or clubs governing aeronautics in the world, determines the world's championship for speed in aeroplanes, was the most important event of the meet, from the viewpoint of sportsmanship. This was won by Mr. C. Grahame-White in a 100 h. p. Bleriot. This flight by Mr. White was also an important demonstration from a military standpoint. I saw Mr. White assembling the parts of this high speed Bleriot, at his hangar, late in the evening before this race. They had just been removed from the packing boxes. At 9.02 the next morning, he stepped into this machine for the first time and, without having ever used a 100 h. p. motor before, started it and immediately won the race, continuing to run over five miles more than the 62 miles required. This impressed me with the reliability of the Gnôme motors and with the ability of the French makers to deliver, disassembled, the various parts of an aeroplane guaranteed to do its duty at once after being hastily assembled. The construction of this machine and the method of boxing the parts render it possible to stow a number of them on board ship and to assemble them, ready for use, in short order. From the appearance of the American machines and the numerous tuning-up performances exhibited by most of them, I gained the impression that they had not as yet been brought to the same state of perfection, either in quality of workmanship, in convenience of assembling, or in reliability.

The Bleriots and Antoinettes were remarkable examples of clever workmanship. The Antoinettes were the most graceful of all in appearance and their wing construction especially showed such marvels of craftsmanship as one would naturally expect from Mr. Nat. Herreschoff in this country.

Mr. White's speed, however, was surpassed during the greater part of this race. One of Mr. Bleriot's favorite pupils, Mr. Le Blanc, driving probably the best 100 h. p. machine yet produced at the Bleriot workshop, appeared on the course after Mr. White and soon demonstrated his superior control by shaving the pylons more closely than Mr. White. He had evidently started hastily and without replenishing the fuel in the tank, for his fuel gave out within 4600 yards of the finish, at which time he was leading Mr. White by about five minutes. The remarkable manner in which

this machine crashed through a 12-inch telegraph pole (cutting out a piece 14 feet long) on landing, without serious injury to either the aviator or the Gnôme motor in front of him, illustrates the safety afforded by the Bleriot design.

Mr. White won this race of 62.14 miles in 61 minutes 4.74 seconds, but he continued for two laps more, and thus, counting out the first two laps, made the required distance in 60 minutes 41.65 seconds, or in 5 minutes 58 seconds less than the previous world's record of Morane. M. Le Blanc's fastest lap was made at the rate of 67.868 miles per hour. This is not the highest speed straight away but includes the retardation due to the turns.* Mr. White stated that his machine became so heated that he thought it was on fire. Although a speed of 100 miles per hour is freely predicted for the near future, this performance seems to indicate that it will have to come as a result of important improvement in the architecture of the plane surfaces rather than from increase in the motive power. The increased efficiency per horse power claimed for the Wright machines seems to indicate this.

Another interesting feature of the race, in this connection, was that Latham's 16-cylinder, 100 h. p. Antoinette, although much faster than his 8-cylinder, 50 h. p. Antoinette, did not show up well in speed by comparison with the 14-cylinder Gnôme motor Bleriots, of 100 h. p. However, Latham's speed in this racer improved on the following day over a smaller and more difficult course. This may have been due to different wind conditions, but it is probable that more experience in control had something to do with it. Walter Brookins started in this cup race in a "Baby Wright" biplane propelled by an 8-cylinder engine of 60 h. p. He encountered engine difficulties and had to descend quickly, in doing which he was injured and the machine damaged. It was stated, after this accident, that Brookins was not out officially as a contestant, but this machine had exhibited remarkable speed for such low power, it having been credited with 70 miles per hour in some of the unofficial records. During a preliminary trial four cylinders had failed to function properly and so this "hope of the Americans" showed that it had not been sufficiently tuned up to defend the cup.

* The world's record for speed over a closed course with turns was made by Jas. Radley in England. He covered a mile at the rate of 75.45 miles per hour.

THE PRINCIPAL EVENT AT HALETHORPE.

The principal event at Halethorpe was Mr. Latham's flight over the city of Baltimore in his 50 h. p. Antoinette. This was purely sensational but was done to give everybody in the city a chance to see an exhibition of airmanship.

Leaving the aviation field, near noon on November 7, Latham followed the course of the Patapsco River to Fort McHenry, thence up the inner harbor to and around the *Sun* building, thence east to the city limits; then he flew a mile north, thence west to Druid Hill Park, then south over Charles Street to Baltimore Street, thence again west and later southwest to the aviation field at Halethorpe. There was also a short detour for the benefit of a wealthy invalid, Mr. Ross Winans, during which some pretty evolutions were performed in the air. The altitude of this flight varied from 400 to 2000 feet and the wind was blowing from 7 to 15 miles per hour. The distance covered was about 25 miles and the time required was 47 minutes 31 seconds.

SOME NOTABLE FEATS.

The cross country flight of Mr. J. B. Moisant, on October 22, the first day of the meet at Belmont Park, is worthy of note and, together with the flights of others for altitude records, is of special interest to the navy. This flight, from Belmont Park to Garden City, L. I., and return, occurred in fog and rain. He quickly disappeared in the mist and after covering the distance of about 30 miles in 40 minutes, appeared suddenly almost at the starting point having managed his course by the compass much as a seaman works dead-reckoning. His 50 h. p. Bleriot differs from the others in having a tail shaped like that of a fan-tailed pigeon and it is supposed that this assisted in steering a straight course.

Moisant's flight, in which he won by a few seconds' margin, the grand prize, from Belmont Park to the statue of liberty and back, although the most sensational event of the meet, because he purchased a 50 h. p. Bleriot (in which he had never sat before) at the last moment and won over Mr. C. Grahame-White in his 100 h. p. Bleriot, was principally notable by the facility with which he managed to steer a perfectly straight course in both directions over a landscape which must have been confused by the maze of Brooklyn buildings. The accurate course of this 35-mile flight, in a

very perceptible breeze, may be judged by his average speed from start to finish (including a circuit of the track at Belmont Park) which was 60.6 miles per hour. Mr. Moisant's method of using the compass is worthy of note. He first marks off on a map or chart the course, or the successive courses, he has to make in order to reach his destination. Then, rising to a height of about 1000 feet, at the point of departure, he swings the aeroplane around to the first course, by compass, and notes the most prominent object ahead on that bearing. Disregarding the compass, he then heads for that object avoiding drift, or leeway, by keeping other objects in the course on the same line of bearing, until he reaches the first turning point laid out on his map. This would be some well charted place. He then swings the machine around to head, by compass, on the next course laid out on the map and again selects a prominent distant object to steer for on that bearing, and so on.

This method, like all navigation, is uncertain in a fog, but the air man, although greatly handicapped by the difficulty of calculating his leeway, has the advantage over the seaman in being able to rise above the fog, as the usual fogs rarely extend to high altitudes. During his flight to Garden City, Moisant kept above the fog sufficiently to see a prominent clump of trees on an elevation at his destination, the captive balloon at the turning point being invisible in the fog, and he ran his courses there and back to Belmont Park accurately by compass and dead reckoning, the principal factors in his measurement of the distance being his time and speed.

Up to the present time, although there have been several flights across the English Channel, and other large bodies of water, no flight has been made in which the aviator has been independent of landmarks for guidance. The problem of accurate flying for distances out of sight of land, or a base ship, presents greater difficulties in navigation but these difficulties are not prohibitive.

NOTE.—Captain Bellanger, of the French Army Aviation Corps flew from Issy to Formerie, in Oise, in a monoplane, on September 8, steering by compass all the way despite the fact that a dense fog prevailed. He there reported for duty in connection with French Army maneuvers and made several noteworthy flights above the contending forces, reporting the position of troops. Late press dispatches record that, on December 10, he flew from Vincennes to Mourmelon, 100 miles, in 70 minutes, or at the rate of 85.68 miles per hour. He was doubtless assisted by the wind, as it is stated that he flew at an altitude of 4900 feet "because of a high wind."

ALTITUDE FLIGHTS.

On the last day of the Belmont meet, Ralph Johnstone broke the altitude record in a Wright biplane, designated the "Baby Grand." This machine had a spread of 26 feet and four cylinders (30 h. p.), being an intermediary between the two "Baby Wrights," one of 8 cylinders (60 h. p.), 21 feet 6 inches spread, the other of 4 cylinders (30 h. p.), 22 feet spread, and the larger surface 4 cylinders (30 h. p.) "roadster" of 30 feet spread. At an earlier date, Walter Brookins had tried for altitude in this same machine, when the engine stopped at about 5000 feet. On landing, the machine was slightly damaged in the skids. Hoxey used this same machine at Halethorpe in high flying and on three successive occasions damaged the skids while landing. During his last effort this engine again stopped at about 5000 feet, obliging him to descend on a soft field, which wrecked the skids and planes beyond repair during the meet. Johnstone and Hoxsey both had the motor of this machine working, on separate occasions, during the maneuvers of landing. This seems to be a necessity with these small surfaced new model Wright machines, which have no front control planes at all, the elevator planes being abaft the vertical rudders. The aviators of both the Wright and Curtiss schools seem to think this is logical progress, but the performances of the Wright biplanes in comparison with the Curtiss and Farman biplanes, both of which had the front control, at these meets, indicate that if this is so, the new position of the elevator planes requires more skill, as in the monoplanes, to handle the machines while landing.

Prior to Johnstone's flight during which he attained an altitude of 9714 feet above the field level (or 500 feet more than the best previous record), Orville Wright had tested this machine, and after Johnstone's flight, stated that Johnstone might have reached 12,000 feet had he kept on climbing. But this is doubtful, as Johnstone's descriptions of the flight show that he repeatedly dropped into what he called "air holes" and had to swoop down 300 feet or more to gain additional speed to hurdle up to the highest altitude. Johnstone had learned that it was not possible to climb to any great height by simply turning up his elevating planes. He knew the exact angle of inclination at which he could get the best results and rise most quickly, but he found that this

angle required frequent change as he continued to climb. From the earth he could dash upward to a height of 1000 feet in one or two sweeping circles. The next 1000 or 2000 feet could be almost as easily conquered, but as he went higher "the air thinned out and grew poor in oxygen." He had to nurse the engine constantly, and had frequently to start it, after it had stopped dead, cranking up with the propellers, by using the force of the wind on their forward sides in a downward swoop of 200 or 300 feet. During these high flights, the aviators, though well protected by warm clothing, suffer severely from the intense cold (as they are unable to take any exercise during the flight), and if they remain long enough up the lubricating oil becomes stiff, or freezes, and the engine stops. Aviators using the Gnôme engine endeavor to reduce this risk to a minimum by the use of castor oil as a lubricant regardless of the expense. The effect of this intense cold, and the rarefied atmosphere, stupefies the aviator, and it requires an appreciable time after the descent before he can talk coherently. These are practical hints with reference to the use of aeroplanes in high altitudes at sea.

During the Belmont meet, Hoxsey, in altitude flights, remained aloft longer than any other aviator. His totalized altitude reached over eight miles, although his highest point reached was 6903 feet and his total time in the air, the greatest during the meet, was 6 hours, 29 minutes, 22 seconds.

A notable feature of the altitude flights was that many were made in very strong winds. On the sixth day, while the wind was blowing in gusts about 25 miles per hour near the ground, and while Latham was giving a fine exhibition of control in his Antoinette around the course, Johnstone and Hoxsey both went up for altitude records. Their speeds were about 38 miles per hour but, on reaching the higher and steadier currents, the wind increased so that they were blown backward gradually. Johnstone at 8500 feet must have been going 40 miles per hour, yet he was blown 45 miles away. Hoxsey went up 6900 feet and landed 25 miles to leeward. Both descended in safety about the same time that a nasty wind squall passed over Belmont Park and made everybody seek shelter. Both of these daring men flew back to the aviation grounds on the following day.

Although the Wright biplane scored its supremacy in altitude

flights at Belmont Park, Drexel in his 50 h. p. Bleriot monoplane, during a struggle of over an hour, succeeded in reaching 8373 feet. He has since at Philadelphia, scored an altitude officially recorded as 9897 feet, which, though higher than Johnstone, is not officially recorded as the highest record, for the reason that it does not exceed the last highest by 100 meters or 328 feet. This is one of the rules governing such contests. It is difficult to measure these high altitudes by triangulation, owing to the frequent disappearance of the aviator in the clouds or above the haze. The barograph, which is simply a small aneroid barometer with a pencil attached to the end of a lever recording on a graduated roll of paper set in motion by clock mechanism, has come to be regarded as the most reliable measuring instrument for altitude flights. It is officially sealed before using and officially opened afterward, but it is apparent that measurements above 9000 feet are so delicately recorded that errors of a few hundred feet may be easily made. This is indicated by the fact that one official measurement of Drexel's last record was announced as 9450 feet only.*

It was noticeable that several of the aviators wore eye glasses, normally, and that during flights most of them wore goggles. Moisant, who does not use goggles always, stated, after landing from his cross-country flight to Garden City, that his eyes were so blinded during the trip that he could scarcely see to make a landing. This was caused by the strong back blast of the propeller in front of him throwing into his eyes much moisture collected from the fog and much oil from the revolving engine. Under the circumstances, goggles would have been entirely useless. There is a simple remedy for this inconvenience and I note that some of the newer designs of foreign aeroplanes take advantage of it. A vertical wind shield before the face, rising to a height just sufficient to enable one to see over it, will throw the wind blast up over the head and leave sufficient calm before the face and eyes to enable one to light a cigar at the highest speed. The front edges and curves of the wings or planes of aircraft are shaped to take advantage of this phenomena by adapting them to rise into the partial vacuum thus created and so to increase their lifting power.

* The press of December 10, 1910, states that M. Legagneux, at Pau, attained an altitude of 10,499 feet in a Bleriot monoplane.

THE DEMOISELLE MACHINES AND SOME NOTES ON DESIGN.

I watched the perfomances of the Santos-Dumont "Demoiselles" at Belmont Park with much interest because of the low center of gravity of this type. They resembled winged tricycles more than aeroplanes, and their flights were always spectacular.

Messieurs Garros and Andemars seemed to control them readily but, although making considerable speed with their 30 h. p. motors, their small 18-foot spread of wings and only 100 square feet of supporting surface, they always flew low and seldom remained long in flight. It is said that M. Garros is not satisfied with the performances of his motor, which is one of the horizontal opposed cylinder type, and that he intends to adopt a Gnôme motor of the same power. It will be interesting to note the effect of this change, but it seems to be the opinion of experienced aviators that the low position of the driver in this machine, although it enables him to get a fine view of the landscape, not only detracts from the speed but makes the flight more difficult to control.

The low center of gravity in the Demoiselle type was the nearest approach to automatic stability exhibited by any of the aeroplanes at these meets. Gyroscopes, pendulums and empirical electric and compressed air devices were notably absent from all designs exhibited. It would be absurd to predict what may yet be accomplished in the direction of automatic stability, but it is notable that the most advanced manufacturers of aeroplanes still rely mainly upon the skill of the aviator for preserving stability or balance in the air.

According to Mr. Moisant, the work of controlling an aeroplane is very easy after it is well clear of the wind billows or waves which, near the earth, are often balloting around and flowing down over the various obstacles on the earth's surfaces. He says "any one except the timid man can learn to fly." It is questionable whether it is desirable to so perfect the aeroplanes that the timid can learn to fly, but this is not necessary in order to make use of them in warfare. Moisant agrees with other aviators in stating that velocity is one of the chief preventives against lateral capsizing. Should a strong current of air lift one side, say the right wing, equilibrium can be restored by a quick dive and a sharp turn of the aeroplane to the right by means of the vertical

rudder alone. Experienced aviators frequently right their machines in this way, without warping the wings or using the ailerons.

Mr. Moisant seems also to have positive ideas about the developments of the future. He thinks that the greatest advances will be made as an accompaniment to increased speed, high speed being a better preserver of equilibrium than flexible wing tips and other special devices, and he has been doing something in France towards the development of a high speed monoplane constructed wholly of metal, including the wings, in which he claims to have made two trial flights.

Mr. J. D. Pursell, a writer in *Aeronautics*, shows very good reasons why great improvement in speed may be expected, without further improvement or increase in the power of motors, by certain improvements in the arrangement of the lifting or plane surfaces and he predicts that it may yet be possible to run at comparatively slow speeds and at the same time have a reserve of power for high speeds with the same plane surfaces. This, of course, would be a wonderful step in advance.

DISTANCE FLIGHTS.

There were no special prizes for long distance flights at either of these meets, but in the totalization of distances at Belmont Park (the sum of the various hourly distance contests, which occurred each day) Latham won first prize in his 50 h. p. Antoinette, having covered a distance of 168 miles. The record for the longest distance yet recorded is held by M. Maurice Tabuteau, who made 289 miles in a biplane on October 28, 1910, at the Aerodrome Etampes, France, during a continuous flight of six hours.

PASSENGER CARRYING.

In the passenger carrying contest at Belmont Park (the greatest live weight carried over three miles), De Lesseps won first prize by carrying 356½ pounds the required distance in 5 minutes, 12 seconds.

In connection with the subject of passenger carrying, it is worth noting that aeroplanes for the navy should be constructed for carrying at least two persons, an operator and an observer, the latter being also a wireless expert. And in pursuance of this

idea it is of special interest to record here a notable event in the history of aviation, the sending of the first wireless message by Mr. J. B. McCurdy, on August 27, 1910, from his Curtiss biplane, during a flight over Sheepshead Bay. Mr. McCurdy describes the details as follows: "The telegraphic key was fastened to my steering wheel and was easily operated. For a ground from the machine I used a wire about 50 feet long, which, after I got well into the air, was thrown overboard and allowed to dangle behind the machine, with one end fastened to the apparatus. The antenna consisted of the guy wiring of the aeroplane so that the whole system was very simple. I flew away for a distance of about two miles and circled at an elevation of about 700 feet. Within this distance the instrument worked extremely well."

The message of 17 words was received by Mr. H. M. Horton, stationed on top of the grandstand of the race track. Since then Mr. McCurdy, at Hammondsport, N. Y., has sent numerous messages to Mr. Horton which were received at a distance of five miles.

ELY'S FLIGHT FROM THE U. S. S. BIRMINGHAM.

On November 9, 1910, the U. S. S. *Birmingham* being available for an experiment intended to demonstrate the practical requirements necessary for the use of existing aeroplanes from naval vessels in scouting, that ship was sent to Norfolk, where at the navy yard, a temporary wooden platform was erected on the forecastle, under the supervision of Naval Constructor Wm. McEntee, U. S. N. This platform was 83 feet in length, 24 feet wide, and built with an even slope of 5°, so that its forward edge was 37 feet above water.

Mr. Eugene Ely, then engaged at the Halethorpe meet, volunteered to make an attempt to leave this platform in a Curtiss biplane after the close of that meet which occurred on Saturday, November 12th. Ely's own favorite 4-cylinder motor was sent to Norfolk that night, from Baltimore, and on Sunday a Curtiss biplane, the same "Hudson Flyer" in which Mr. Curtiss had flown from Albany to New York, was transported to the navy yard. On Monday morning, November 14th, this aeroplane was placed on the *Birmingham's* temporary platform and it was noted then that the running distance, from the front wheel to the edge of the platform, was 57 feet. The motor was then mounted and, without

any previous tuning up or test of the reassembled aeroplane having been made on shore, the ship steamed to Hampton Roads, followed by the torpedo destroyers *Roe, Terry, Stringham* and *Bailey*.

The weather was unsettled, with low clouds and occasional light showers of rain and hail, but the wind from S. S. W. was not blowing more than 10 miles per hour.

Wireless telegraphic reports, however, indicated a change to strong northerly winds for the following day, and it was determined to proceed with the experiment that day, in the rain if necessary.

The original intention was to steam out into Chesapeake Bay, head the ship to the wind at about 10 knots and thus attempt a flight up the Elizabeth River to the Norfolk Navy Yard, with the torpedo boats stationed along the route in attendance. But the thickness of the weather rendered landmarks so obscure, that the ship was anchored off Old Point Comfort to await a possible improvement. Once, the torpedo boats were sent out and the ship got under way to begin operations, but an extra heavy fall of rain came on and proceedings were delayed. At about 3 p. m., another attempt was decided upon and, while getting under way, Mr. Ely took his seat in the biplane to test the motor. As his engine was gradually spun up to full speed, the powerful back draft from the propeller so disconcerted the helmsman on the bridge, his face being directly behind that propeller, that it was doubtful whether he would be able to steer the ship from that position. Suddenly, while 20 fathoms of chain were still out, and without previous warning, Mr. Ely gave the signal to let go and at 3.16 p. m., he quickly flew off the platform without having any assistance from the ship whatever in the matter of speed, or lifting power. He had realized that weather conditions would not improve, and had suddenly concluded to try the experiment from a standstill.

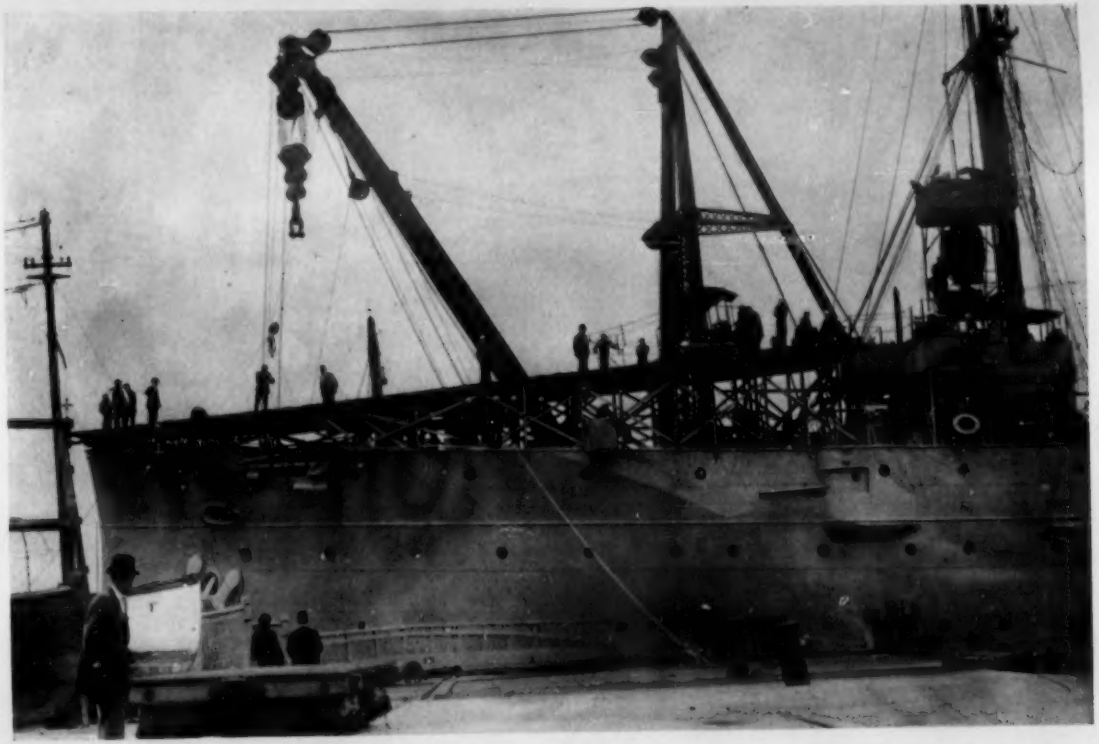
His aeroplane followed accurately the middle line mark on the platform, and its tail cleared the forward end by about 20 feet, before he gave it a graceful, bird-like swoop or vol plane (to increase the speed) and then he gradually arose to a height variously estimated at 150 to 500 feet. In thus swooping down, the lower part of his machine, the skid framing and the pontoons, struck the water and was sufficiently submerged to demonstrate that if

his speed had not already been accelerated to more than sufficient for flight, the retardation caused by the plunge would have prevented further flight. He explained later that his touching the water was entirely due to a miscalculation in moving the rod of the front control or elevator. His rod had been lengthened, since his previous use of it, to suit another aviator, and when he pulled it towards him to raise the elevator he did not give quite enough angle to the planes to prevent too deep a dive. On striking the water, the propeller tips struck also and both driving edges were splintered. This did not apparently affect the control or the speed of the aeroplane, and it demonstrated that such a propeller may be considerably damaged without affecting a flight seriously.

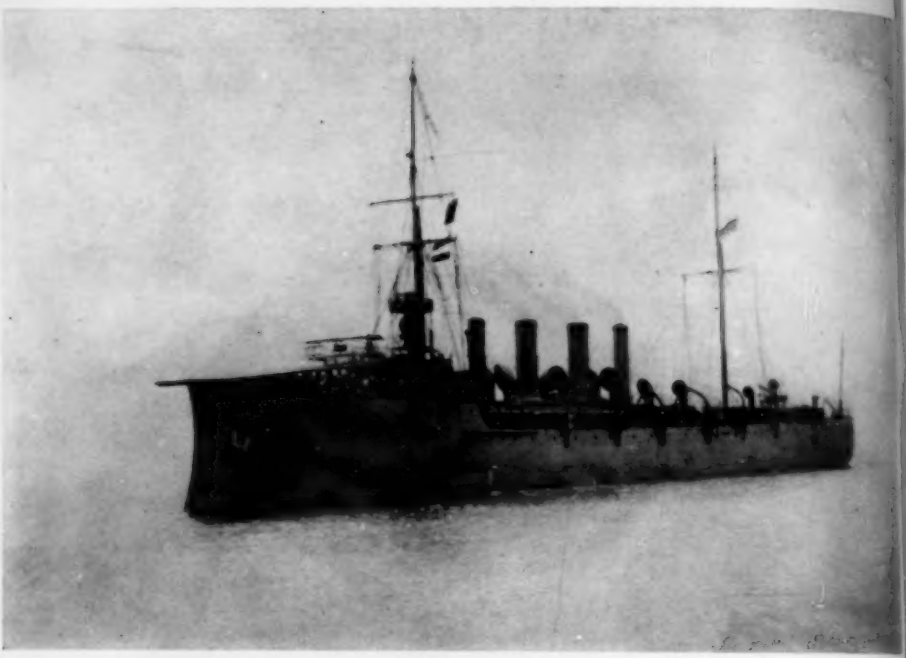
A quantity of salt water was splashed up over his goggles, and this, combined with the continued rain, rendered very obscure his view of the necessary landmarks, that were further obscured by the thick weather. He accordingly became confused in his bearings, and after about four minutes in flight, seeing the broad beach on the north side of Willoughby Spit spread out invitingly under him, he decided to land there. This he did, in the soft sand, without any damage to the aeroplane, after a flight of 2½ miles. I was pleased to learn that he had not continued on towards Norfolk, as I had begun to have grave doubts about his ability to get his bearings in thick weather, over a landscape with which he was unfamiliar. After he had demonstrated his ability to leave the ship so readily, without assistance from the ship's speed, or from any special starting device, such as that formerly used by the Wright brothers, my satisfaction with the results of the experiment was increased, for two reasons:

(1). The point of greatest concern in my mind about carrying out the original program was the uncertainty of stopping the ship or changing the course in time to prevent running over the aviator in case he should land in the water.

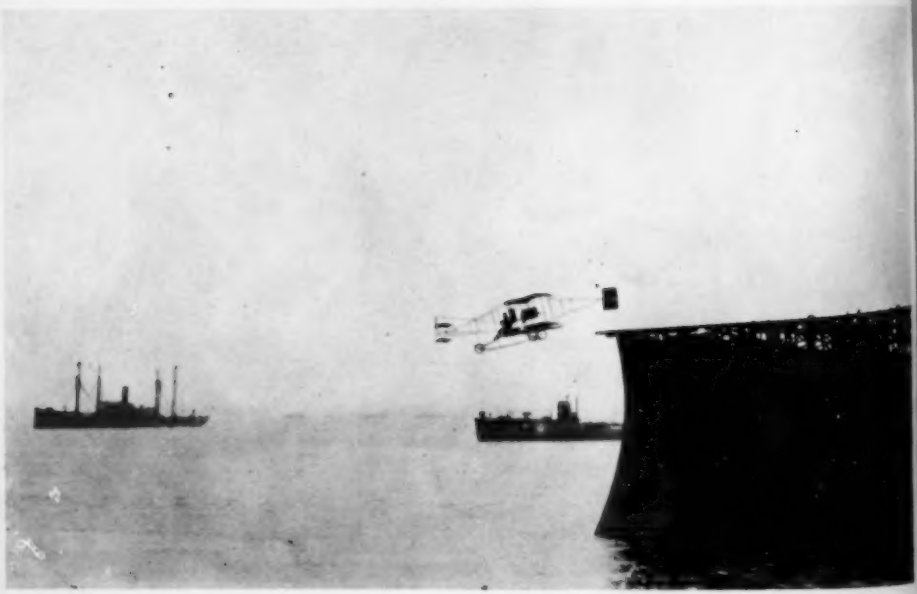
(2) His demonstration, that an aeroplane of comparatively old design and moderate power can leave a ship in flight while the ship is not under way, points clearly to the conclusion that the proper place for the platform is aft. An after platform can be made longer, will not require a loosening of the stays of any mast, and its essential supports can be so rigged as a part of the permanent structure of a scout cruiser as to cause no inconvenience in arranging the other military essentials of the ship's design.



CURTISS' AEROPLANE BEING ASSEMBLED ON TEMPORARY PLATFORM ON BOARD THE U. S. S. "BIRMINGHAM," NOV. 14, 1910.



U. S. S. "BIRMINGHAM" WITH CURTISS' AEROPLANE ON TEMPORARY PLATFORM READY FOR A FLIGHT, NOV. 14, 1910.



MR. EUGENE ELY IN FLIGHT FROM U. S. S. "BIRMINGHAM," NOV. 14, 1910.

This information amply repays for the small expense of rigging the experimental platform. Furthermore, if it be desired to have an aeroplane land on board of the ship the after position of the platform is the best for that purpose. It would be comparatively easy, in smooth water, for a scout to steam head to wind at the proper speed to allow of the gradual approach and descent of an aeroplane to a platform located aft. Safety nets at each side of a middle runway could easily be rigged. If the condition of the wind and sea should render such a landing inadvisable, the aviator could land in the water under the lee of the ship and be picked up by a boat's crew. The machine used by Mr. Ely on this occasion was supplied with two cylindrical air chambers called "pontoons," under the lower planes, to impart the necessary buoyancy, and the aviator himself was equipped with a pneumatic life-preserver.

Photographs of Ely's start, the temporary platform and the machine used are appended.

THE AEROPLANES AND THE AVIATORS.

Details of the machines used at Belmont Park, and the names of the aviators using them, as published by the official starter of the meet, will be appended to this report in tabular form. These details will cover also all the aeroplanes used at Halethorpe.

In this country there are already numerous biplanes and some monoplanes and triplanes, other than those tabulated in the appendix, each with distinguishing characteristics, that have made successful flights. It is to be hoped that an exhibition will soon be given in this country equal to that which opened in Paris on October 15, 1910.

At this Paris Exhibition, improvements were shown in the Farman and Voisin biplanes and many improvements and novel features in both biplanes and monoplanes of other makes. Most of the best known makes and many new designs were represented. The following list of the important exhibitors or companies showing full-sized, ready-to-fly, aeroplanes on exhibition illustrates the advance made by France in this industry. Louis Paulhan, the Nieuport, the Esnault-Pelterie, the Ferdinand Loire, the Turcat-Mery et Rougier, Ardineau & Co., the Goupy, Régy Frères, the Compagnie Aerienne, the Avia, Louis Bregnet, the C. I. N. A. (Compagnie Internationale de Navigation Aerienne),

the Chantiers Tellier, Paul Koechlin, Clerget & Co., Henry Coanda, Henri Fabre, Passerat & Radiguet, the Antoinette, Roger Sommer, G. Vinet, Sloan and Co., the Hanriot and P. J. Gregone.

The most original departures from familiar makes at this exhibition were the biplane of L. Paulhan, the hydro-aeroplane of Henri Fabre and the biplane of Henry Coanda. Paulhan's machine includes certain features patented by Henri Fabre, with whom he has been collaborating. It bears little resemblance to any previous machine, the elevator is slung on leather straps and works by the bending of these straps, the long skids are linked up to the main frame members by an intermediate strut of wood, also attached by leather straps at each end, and the tail is also attached by leather. The main frames of the structure that do duty for the forward edges of the planes, elevator, rudder and tail, are made up like bridge trusses of a series of endless V's. They are composed of two long flat planks separated by short struts of the same width as the planks, and held in position by angle plates and copper rivets. Instead of warping the wings or using ailerons, the whole angle of incidence of the wings is altered. Mr. Paulhan believes that this V method of constructing the main members of the planes is lighter and stronger than any other, and that the passage of the air through the dihedral, or truss arrangement makes for lateral stability. The plane surfaces are simply hooked on to these spars and supported rearward by flexible ribs which fit into pockets in the fabric. These ribs can thus be easily replaced when broken. This machine has other novel points, in details, and is said to have flown quite satisfactorily, even in its experimental stage.

The hydro-aeroplane of Henri Fabre shows the same dihedral bridge trussing of the front edge spars as Mr. Paulhan's biplane. It has two tandem planes with the small plane leading and a small elevator over the top of the forward plane. Each of the main or after wings has a mast about one-third of its length from the body and at the foot of each mast is a float. The front planes also have a float under the mast which carries them both. While on the water the structure is thus supported at three points. Mr. Fabre has, on many occasions, risen from the water and made flights of six to nine miles over the mouth of the Rhone and he has found by experience that no vertical rudder is necessary, for

the dihedral, or truss, frames act effectively as rudders, the whole front plane being swung around its mast horizontally.

The Coanda machine is a clean-cut model without superfluous air-resisting parts. Its chief novelties consist of wood being used entirely in the wing or plane construction and in the replacement of the usual propeller by a turbine fitted in the bow.

An Etrich monoplane, by an Austrian engineer of that name, was expected at the Belmont Park tournament but failed to arrive. This has several very novel features of control and construction, including a bridge-truss arrangement for supporting the wings, and has met with considerable success in flight.

There are several new types that have made successful flights in England, a very notable one being a peculiar biplane by Lieut. J. W. Dunne, with the planes sloping aft on each side of a boat-shaped body or chassis. This is said to be a step towards improvement in stability.

An interesting and novel idea is that of a Japanese officer whose machine, with a double set of wings is patterned after the dragon fly. With this he claims ability to hover over an object after the manner of that insect.

EXTENT OF AVIATION INFORMATION AND LITERATURE.

The world's progress in aviation is being watched with such interest that a great many readers of the newspapers who have not time to read the vast volume of existing literature bearing upon the scientific and practical investigation of this subject, feel competent to discuss the achievements of the aviators and to improve upon the designs of aeroplanes. The Wright brothers are commonly regarded as having made their discoveries in a haphazard though practical way. Fact is, their success is due to a careful analysis of all previous information and a most painstaking investigation conducted by purely scientific methods supplemented by frequent tentative experiments.

Aviation as an art is such a fascinating study and experimentation with models and gliders is so easy that thousands of people in all parts of the civilized world, youths, men and even women, rich and poor, are devoting a large share of time and money to it.

There are over 50 aeronautical societies and influential bodies in the world studying earnestly to advance the art and add to the science of aviation. Patents on the subjects are increasing at an

alarming rate, the spirit of competition is keen and, I regret to say, jealousy among aviators as well as among designers is already apparent, although aviation has not yet produced successful machines for traffic or commercial use. It is very probable, however, that certain manufacturers of aeroplanes, particularly those in which the industry is an adjunct to an establishment for the production of lightweight motors, are making a commercial success of aviation. This is due principally to its success as a sport and to its promises of usefulness in warfare.

Many writers on aviation are predicting all sorts of dire disaster to battleships from aerial warfare, with much of the same sort of enthusiasm and abandon as actuated the early prophets of torpedo warfare, but conservative writers believe that it is yet too early to forecast the full development of aerial warfare, although they admit that it will play an important part in future wars.

It may be assumed, however, that the present state of development will limit the use of aeroplanes, in the navies of the immediate future, to reconnaissance or scouting duty.

The extent of existing literature on aeronautics and aviation is not generally known. There are already more than 400 books on the subject; many of them large standard works, and over 25 current publications. Many people are actively engaged in writing and compiling other books to keep the literature up to date. I have endeavored in this report to jot down the salient features only of my observations and to avoid mention of what is commonly known. There should, however, be collected, at the Navy Department, a library of the most important standard works and current literature on the subject of aviation, for the benefit of those who may be specially detailed to thoroughly investigate the development of aviation in the navy.

THE DEVELOPMENT OF AVIATION IN THE NAVY.

The development of air craft bears close analogy to the development of boats both scientifically and practically. The equations of motion in both air and water are similar and the dynamical properties of both elements are very much alike, so that the data obtained from model experiments in water may with slight variations be used for compilations in the design of aeroplanes. Already the lines and architecture of an aeroplane can be worked out as readily as those of a racing yacht.

The boats of the navy are provided by the joint action of the Bureaus of Construction and Repair and Steam Engineering, and the engineering problems involved in the construction of aeroplanes deserve consideration by the skilled talent of both bureaus. The design of the motive power, however, occupies a more important place in the problems of aeroplane construction than it does in the construction of boats. Failure of the motive power in a boat is insignificant in comparison with a like failure in an aeroplane and it is principally due to improvements in motive power that the use of aeroplanes has been made practicable. Lightness combined with strength and reliability is of paramount importance in the aeroplane work that naturally pertains to both bureaus. The structural work of the frames, planes and control mechanisms calls for special skill such as that displayed in the shops of eminent boat builders, but the work involved in the design of aeroplanes depends to a greater extent, than in the development of boats, upon the practical experiences of the men who will use them and, for this reason, the Bureau of Navigation is also especially concerned in the work of development. The Bureau of Ordnance is also concerned with the development of ordnance material for defensive use in aerial warfare.

The Navy Department is already fairly well equipped with a model plant at the Washington Navy Yard for the scientific investigation of problems connected with the design and construction of aeroplanes and with an experiment station at Annapolis for investigating the problems of motive power and for testing.

In view of the above, it seems that the organization of the Navy Department is well equipped for taking up the study of aviation and the development of aeroplanes for naval purposes and that a safe guide in the assignment of cognizance is to place the design, supply, installation, maintenance, repair and use of aeroplanes in parallel with that of boats for the navy.

The boats of the navy that are provided with steam or other mechanical power cost from $1635 (for the 28-foot motor whale boat), to $25,037 (for the 50-foot steam cutter); the cost of the motive power being from 50 to 59 per cent of the total.

Aeroplanes of proven types are now advertised in this country for from $1675 to $10,000, the cost of the motive power being about 50 per cent of the total.

It is, therefore, recommended that aeroplanes in the navy be placed in the same category as boats and be acquired, in like manner, as equipage.

Whatever may be the results obtained from the future development of aeroplanes for use on land, a type or types, specially adapted to the naval service is yet to be developed. For this reason, I recommend the immediate purchase of only such of the existing aeroplanes as are needed for the tentative and progressive instruction of our personnel in their use. It is also recommended that the sum of $25,000 be authorized by Congress for experimental investigation of the practical problems to be presented during the progress of instruction and in the establishment of special facilities for carrying on such work in a systematic way.

We are fortunate in being able to rely, to a certain extent, upon the U. S. Aeronautical Reserve for trained aviators, many of them equipped with aeroplanes, to expand our resources in emergency, but it would be folly to depend entirely upon this source and our aim should be to so master the subject of aviation within the service that we may advance the science from a nautical standpoint and so assist these experts to a correct understanding of the conditions and problems which are of special importance to the navy.

For a beginning, I recommend that the Department assign two aeroplanes, or at least one two seated aeroplane (with necessary spare parts) as part of the equipment of each scout cruiser. It would probably be advantageous to obtain one of each of the most advanced types made in this country to begin with, although Mr. Glenn Curtiss has already made some independent experiments with aeroplanes fitted to rise from and land on the surface of the water, but such considerations as this should be left for recommendation by a special body of officers, detailed to study the subject, from the bureaus having cognizance.

TRAINING OF THE PERSONNEL.

The training of qualified aviators in the navy should be advanced simultaneously with an extension of our training to use wireless telegraph from aeroplanes, to the end that, if possible, each aeroplane used from a ship may carry an aviator and an observer, both qualified to control the machine.

Aeroplanes have already been developed abroad with this object in view, the two seats being each provided with control apparatus enabling each man to alternate in control. All aeroplanes used for instruction in France are two seated and monoplanes, as well as biplanes, have been produced which can carry two passengers in addition to the pilot.

There are numerous aviation schools in Europe, each provided with suitable practice fields or "aerodromes," and it is estimated that about 300 pupils have already qualified in the commercial aerodromes alone. At least two fields suitable for this purpose, controlled by the Navy Department, already exist on the Atlantic Coast, one adjacent to the Experimental Station at Annapolis (suitable for summer work); the other at the Navy Yard, Charleston, S. C. (suitable for winter work). Each place would probably require a moderate amount of surfacing and the construction of sheds or hangars. On the Pacific Coast, it is probable that suitable facilities could be found near the coaling plant at San Diego, Cal., and this would be convenient to the aerodrome of Mr. Glenn Curtiss at that place.

There are many ways in which *preliminary instruction* can be carried on without danger and without much expense in repairing damaged machines. French aerodromes are variously equipped with specially prepared machines for the use of pupils. The Voisin Company, for example, has an aeroplane closely resembling its ordinary product but with the power and the angle of incidence of the planes so capable of adjustment that it is impossible for even an expert to rise very high or to remain in the air for many minutes. The Clement-Bayard Company and the Antoinette makers each use aeroplanes without wings, or planes, for the instruction of beginners and such devices are suitable for use at any place where there is not sufficient space available for a large aerodrome. A practice machine, costing from $100 to $200, with about 100 square feet of plane surface suitably disposed in connection with a motor cycle, driving an air propeller, either on land or mounted in a suitable boat, would provide an excellent means for learning the rudiments of flying. But these are also details which should be left to those organized to advise the Department on the subject.

The systematic training of naval aviators may be readily inaugurated with the aid of the torpedo flotillas, or possibly of

torpedo boats in reserve, by stationing one or more boats at a time, temporarily, in succession, at or near each of the practice fields, the boats being used as headquarters, or bases for instructional work.

The further needs of the service for carrying on this instructional work could thus be easily and practically developed. But, *prior to this* and while the first aeroplanes are being procured, at least one officer should be sent, for instruction, to each of the established aerodromes in this country. The California aerodrome of Mr. Glenn Curtiss is probably the best at present and is eminently suitable for instruction during the winter months.

One of the earliest steps recommended, is the establishment of an *Office of Naval Aeronautics* in the Department, and the detailing of a representative from each of the Bureaus of Construction and Repair, Steam Engineering, Navigation, and Ordnance to study the subject of aviation and to recommend the measures to be taken, from time to time, for its development in the navy.

These officers should constitute a council or board to meet at the office of Naval Aeronautics, whenever required to consider recommendations and whenever necessary to consult the literature, which should there be collected, or to discuss the many questions involved.

A library of standard aeronautical works, current aeronautical literature, small models, plans and all available information on the subject should be systematically collected at this office and kept up to date under the directions of the senior officer detailed to preside and to attend to the correspondence.

ADDITIONAL NOTES ON AVIATION.

The compass used by J. D. Moisant, mentioned in the preceding report, has been frequently represented by him as "a glycerine floated compass." I presume glycerine renders the needle less sensitive to vibration.

A compass specially designed for aerial navigation, designed by M. G. Deloz, is described in *L'Aerophile* for December 1, 1910. This is similar to the usual mariner's compass in everything pertaining to the suspension or balance and the provisions against oscillation and vibration, but the bottom of the bowl is of glass for the purpose of enabling the aviator to see through it. The compass needle is suspended beneath a disc of mica or other trans-

parent substance. Upon this mica disc is engraved a series of parallel lines, with occasional cross lines, and it may be turned in azimuth, through the medium of a milled head button above the compass face, without disturbing the needle. The parallel lines may thus be pointed in any given direction and the mica disc again allowed to settle upon the needle in such a way that it follows the needle in its movements.

We can readily see how this compass would be of service in following a charted course over a visible landscape, but to adapt it for navigation over the sea some modification may be necessary. It is possible that a mirror attachment may be made to reflect the image of the base ship upon the compass dial and so assist in maintaining a correct course.

In connection with the subject of overwater flights the following official account of J. A. W. McCurdy's record flight across the Florida Straits is interesting:

EXTRACT FROM REPORT OF THE COMMANDER OF EIGHTH DIVISION, ATLANTIC TORPEDO FLEET.

In safeguarding such a flight many conditions had to be considered. (a) The sea could not be rough if the aeroplane was to be saved in case of alighting in the water. (b) The vessels must always be close enough together in order that the aeroplane could always be in sight of at least one vessel; Mr. McCurdy stated that the visibility of his machine was about five miles, so ten miles was taken as the proper distance between stations. (c) The aviator must be provided with a buoyant and yet light life preserver. Captain W. I. Chambers, U. S. Navy, sent to me a pneumatic life preserver for this purpose which was worn by Mr. McCurdy. (d) In case of thick weather shutting out a view of the sea and the destroyers it became necessary to provide a means of steering a course. This was arranged by using a small navy boat compass, attaching it to the frame of the aeroplane below the aviator's seat. In order to make sure of its accuracy the machine was swung around after installing the compass and by means of reciprocal bearings on another compass about 30 feet away, it was found the mounted compass was nearly magnetic.

At the suggestions of Mr. McCurdy a platform with a hinged tail was rigged on the stern of the *Paulding*, the idea being in case of alighting in the water to haul the aeroplane up on this platform and allow him to attempt a second flight. The material of this platform was furnished by the Curtiss Company and built by the men of the destroyers.

The 24th was selected as the earliest day possible to make the flight. On the 24th, however, a very strong northeast wind was blowing and the sea in the Straits was too high for safety in case of alighting. The weather condition was watched very carefully both at Key West and Havana, and the commandant at Key West arranged that these reports

should be collected at the wireless station every four hours and copies delivered to the *Paulding*. There was no break in the weather, the barometer remaining high, until Saturday, January 28, 1911, when at Key West the wind seemed to have lulled, and Havana reported but little wind. The four destroyers left Key West at 3.30 a. m. and proceeded to a point 40 miles south by west of Sand Key light. It was soon seen that the conditions were unfavorable and that a flight would be extremely hazardous in case the aviator was forced to alight. This opinion was sent to the commandant at Key West and telephoned to Mr. McCurdy, who at once agreed to abide by advice of the commanding officers of the destroyers. The *Terry* and *Drayton* were then sent into Key West and the *Paulding* and *Roe* proceeded to Havana. We visited the Belen Observatory kept by Jesuit fathers, and Father Anguati informed us that there would be no change in the conditions until the two anti-cyclones had passed. He explained that the spell of weather had been long due to the passage of one anti-cyclone after another, and that if a low appeared the conditions would become better at once. I notified Mr. McCurdy of this through the commandant at Key West, and Mr. McCurdy sent definite word that there would be no attempt to fly until Monday at the earliest.

On Sunday afternoon the wind seemed to drop and the sea on the Malecon at Havana, which had been large all the week, was seen to be lessening. We visited Belen Observatory Sunday night and were told that the barometer was falling, that the next day would be calm, and advised that opportunity be taken of it. A wire was at once sent to the commandant at Key West of the expected conditions and Mr. McCurdy notified that the next day, Monday, January 30, 1911, would probably offer the conditions sought.

The four destroyers made a rendezvous at 6.00 a. m., 90th meridian time, at a point 30 miles south by west one-half west of Sand Key light. It was seen that the wind would be of small force and there was but little sea, only the natural swell of the ocean. All agreed that we could not let an opportunity go by, even though the following day might see the ocean smoother. The *Roe* was told to wireless to the commandant at Key West to notify Mr. McCurdy that the conditions were good, that we advised a start be made, and that the destroyers were taking station.

At 6.30 a. m., 90th meridian time, all vessels safeguarding the route to be taken were at their stations. The lighthouse tender *Mangrove* was five miles from Sand Key, the revenue cutter *Forward* ten miles from Sand Key, and the destroyers spaced at intervals of ten miles from the *Forward*, on the line between Sand Key and Morro lighthouse. At 6.30 a. m., meridian time, the *Roe* reported by wireless to Key West that all vessels were ready. A light air had sprung up from the southeast.

At 7.22 a. m., 90th meridian time, Mr. McCurdy launched his aeroplane into the air, and at 7.34 a. m. he passed the Key West wireless station at a height of something under 700 feet. This news was wirelessed from Key West and received by all destroyers. The commandant at Key West ordered hoisted a large flag at a wireless mast which was hauled down as the aeroplane passed, a signal to the tug and steam launch patrolling be-

tween the city and Sand Key light to watch for the aeroplane. At 8.11 a. m. the *Roe* wirelessed that the aeroplane had passed over her and all destroyers at once steamed with all possible speed with three boilers or about 26½ knots speed, for Havana. From the time of passing the *Roe* no other message could be received, as the *Roe* only could send by wireless. The aviator successfully passed over the *Drayton* at 8.55 a. m., 90th meridian time, and *Terry* at 9.17 a. m., and at 9.15 a. m., 90th meridian time, was in sight of the *Paulding*. At 9.17 a. m. the *Terry* hauled down her flag hoisted as a signal that he had passed over her. At 9.33 a. m. the aeroplane descended slowly and was seen to alight on the water. The *Paulding* at this time was about seven nautical miles from Morro and about eight to nine miles from the *Terry*. The *Paulding* turned and steamed back to where the aviator had alighted. It took exactly 12 minutes after the turn to reach the *Terry*, which had stopped close to the machine and had rescued the aviator, so that the aeroplane alighted about five miles to the northward of the *Paulding*, making twelve miles from Morro. When the *Paulding* arrived at the scene Mr. McCurdy was sitting in the *Terry's* lifeboat, directing where to make lines fast to the aeroplane.

It was found impossible to use the hinged platform to run up the machine and after considerable difficulty, owing to the swell and the frailness of the aeroplane, we succeeded in skidding it up the vertical side of the ship and landed it on deck. The cause of alighting was believed at first to have been due to a hole in the engine crank case allowing the oil to run out, but, afterwards, it was discovered that this hole was the effect and not the cause. The lubricating oil gave out about the time the aeroplane passed the *Terry*, and in the next 10 minutes before he alighted, at 9.33 a. m., all of the engine bearings had burned up. There was nothing to do but alight, and the manner in which he did so showed the possibilities of the use of aeroplanes over water. If the sea had been rough, undoubtedly Mr. McCurdy would have been thrown from his seat, but on this day there was no such danger, and he said he did not even get wet. The machine did not float upright; the engine was submerged and the front horizontal steering planes elevated in the air, the tail steering planes were broken in alighting. It would have been impossible to again fly this machine until thoroughly overhauled at the factory. Other damage was done to the aeroplane by the boats and in getting it on board the *Paulding*, but all of a minor nature.

When the *Roe* arrived about 10.15 a. m., a message was sent by her to notify Captain Hayden that the aviator had alighted 12 nautical miles from Morro and was safe. The Cuban gunboat *Hatuey* appeared at 10.30 a. m., with President Gomez on board and offered congratulations to Mr. McCurdy and asked if she could be of service. The message was received by the *Roe* and thanks were sent back by wireless to the President of Cuba.

At 11.45 a. m., the *Paulding*, with Mr. McCurdy on board, and in company with the *Terry*, *Roe* and *Drayton*, steamed for Havana harbor, arriving at the entrance at 12.22 p. m. Great crowds of people could be seen everywhere; on the Malecon, on Morro, and on the housetops; they

gave Mr. McCurdy an ovation as the *Paulding* steamed close by and they could see the aviator on the bridge. All four vessels moored at buoy No. 2 in the harbor of Havana.

Mr. McCurdy decided, as he had but one aeroplane in good condition and must use that every day at the meet at Camp Columbia, to defer his trial of flying from the platform on the *Paulding*. He expressed a hope of being able to make the flight from Key West again. It is the opinion of the officers of the destroyers, that Mr. McCurdy's covering only 90 of the 106 statute miles between Key West and Morro in no way detracted from the wonderful exhibition of nerve and daring displayed by him, and to alight in the ocean, as he did, unhurt, and his machine only slightly damaged, was even more wonderful than if he had safely landed at Camp Columbia, and further, the fact that Mr. McCurdy could and did steer a compass course is of great advantage to the future progress of flights across water. Captain R. E. Hayden, commandant of the naval station at Key West, planned and executed the methods of wirelessing information and safeguarding the aeroplane until the *Roe*, the first destroyer, could be reached.

The delightful personality of Mr. McCurdy made the ready co-operation of every one in Key West and on board the ships a foregone conclusion, and that he did not complete his journey was as great a disappointment to the officers of the destroyers as it was to Mr. McCurdy himself.

Thanks are due to the interest displayed by the weather bureaus both at Key West and at Havana, particularly to the Jesuit Fathers at Belen Observatory.

(Signed) YATES STIRLING, JR.

Civil Engineer F. O. Maxson, U. S. N., by careful triangulation, observed the altitude of McCurdy, as he passed over a point 44 feet distant from the northwest wireless mast at Key West, to be 684 feet above ground and 691 feet above sea level.

FROM REPORT OF COMMANDING OFFICER U. S. S. "TERRY."

This vessel left the dock at Key West naval station about 3.30 a. m., 75th meridian time, on January 30, 1911, and in company with the U. S. S. *Drayton* made a rendezvous with the U. S. S. *Paulding* and U. S. S. *Roe* at 6.40 a. m., at a point midway between Sand Key light and Morro Castle, Havana. At this point the *Terry* was stationed for the flight and kept position by the *Drayton*, bearing N. by E. ½ E. magnetic.

At 7.30 received wireless message that aviator had started from Key West, and at 8.23 that he had passed the U. S. S. *Roe*. At 8.23 went ahead on course S. by W. ½ W., magnetic, at 24 knots. At 8.38 sighted aeroplane apparently astern of *Drayton*.

At 9.17 the aeroplane passed directly over the *Terry* at a height of about 700 feet. The aeroplane deviated slightly to the right of the course after passing the *Terry*, but his bearing was constantly kept with pelorus.

After the aeroplane passed the ship speed was increased to about 26½ knots.

At 9.32 the aeroplane was observed to glide quickly toward the water, and at 9.33 it alighted on the water, with a splash, about three miles away. The ship was immediately headed for the point of fall by compass and at a speed of about 30 knots.

The machine could not be seen on the water at first, but after about three minutes' run it was sighted directly ahead, with the aviator safe, sitting on the machine and in the water about to his waist.

The pontoons of the machine were entirely submerged, and it seemed to me that the machine's only reserve buoyancy was in the bamboo parts and the gasoline tanks.

The vessel was backed full speed and stopped with the aeroplane about 30 yards abreast the foremast, at 9.40, and two life-boats, one in charge of Ensign N. L. Nichols and one in charge of Ensign C. C. Slayton, sent to his assistance. Mr. Slayton's boat rescued the aviator and both boats waited with the aeroplane to assist in getting it on board the *Paulding*.

It was very difficult for us to keep the machine in sight in the water, and in future over-water flights the aviator should carry a furled flag of considerable size to be hoisted in case of having to land in the water.

Ensigns Slayton and Nichols noticed many sharks in the water after the boats had gathered around the aeroplane.

M. E. TRENCH.

The following extracts are made from McCurdy's account of this flight:

As I left the sand wastes of the Florida Keys behind me I was amazed to find the sea confronting me instead of being below me. I beheld a mirage, not as seamen see this phenomenon, but as though I were part of it.

It was impossible at first to discern the boats that I knew were stationed below in the waters surrounding Key West, but before me, as in a vertical picture, appeared the smoke signals of the torpedo-boats that I knew were many miles beyond me.

Having had no experience with mirages, I could not depend upon this uncanny guide with certainty, and I, therefore, turned to the compass for assistance.

As the strength of the sun's rays increased, the mirage disappeared and I sighted the *Roe*, the first of the destroyers in the line of flight.

As I sailed over the destroyers I could plainly see the sailors at quarters and the white uniforms of the men stood out distinctly in the warm clear sunlight.

Soon I became accustomed to this and the sensation was glorious as I rushed forward at 50 miles per hour toward this wonderful panorama which then appeared to recede from me. It seemed no time before the Morro and Havana were in plain view.

Previous to McCurdy's flight across the Florida Straits, the best performance in flying wholly over or across water was that of Robert Loraine, the English actor-aviator, who on September 11,

1910, made a flight of 55 miles across the Irish Sea from Holyhead, falling to the water just before he reached the Irish coast.

Altitude Flights.—On December 9, 1910, M. Legagneaux, at Pau, France, attained an official height of 10,409 feet, in a Bleriot monoplane and on December 27, 1910, Arch. Hoxsey, at Los Angeles, Cal., in a Wright biplane, attained an altitude of 11,474 feet. Unfortunately, the barograph which recorded this flight was not immediately calibrated and was injured during the subsequent flight in which this brilliant aviator lost his life.

Distance Flights.—The French Michelin prize for distance, during 1910, was finally won by Tabuteau at Buc on December 30, 1910, at which time Legagneaux's latest record of 320 miles was exceeded. The official distance of this flight was recorded as 360 miles and the time 7 hours, 48 minutes. He used a Farman biplane fitted with a Renault motor.

Passenger Carrying.—M. Roger Sommer recently took up six passengers in a large biplane at Douzy, France, and, after circling the aerodrome at a height of 100 feet, flew to Rouilly and return, a world's record for cross country flight with passengers and total weight lifted.

Soon after this M. Le Martin, at Pau, made a new world's record when he took up seven passengers, in a monoplane, for a five-minute flight.

The longest cross-country flight yet recorded is that of Captain Bellanger, of the French Army Aviation Corps, who flew from Paris to Pau, a distance of 500 miles, during which a landing was made at Bordeaux and at other places to renew gasoline.

AEROPLANE WIRELESS TELEGRAPHY.

The following details of Mr. H. M. Horton's interesting aeroplane wireless plant are taken from his description in *Aeronautics* for January, 1911.

The entire aviation set weighs but thirty pounds and consists of: First, the power plant, a small compact storage battery that has an actual ampere hour capacity of 60 and a voltage of 6; a high frequency coil that weighs but 12 pounds, a helix with two small condenser tubes mounted in parallel and the transmitting key.

After describing the disappointments of the first installations, he says:

A way was finally worked out, however, to make all the stays on the machine, the engine, tanks, in fact all metal parts, act as part of the

oscillating system. The aviator's levers being connected thereto and uninsulated, and being firmly grasped in his hands, the oscillations were actually passing through his body each time the transmitter was operated, but inasmuch as the other side of the oscillating system was carefully insulated, he experienced no ill effects.

Our new receiver consists of a very small loose couple, a set of head telephones and the "Pericon," all nested in such manner that the entire set is but 4 x 4 inches and weighs but 3 pounds. In testing the new receiver the first morning it arrived, we were not a little pleased to pick up Buffalo Station, 142 miles distant, and with high mountains surrounding us on all sides.

So far our experiments have been successful beyond our expectations, clear and loud signals coming from the air station no matter where she has gone, and because of the strength of the signals that have been received from our air station over the distances which we have now tried, we are led to believe that a proper war machine, with the wireless apparatus built therein as an integral part, will be able to transmit to and receive intelligences from headquarters stations any distance the aeroplane scout would be liable to be sent in times of war.

Recent tests in wireless aeroplane telegraphy conducted during the Aviation Meet at San Francisco, Cal., resulted in unqualified success. The apparatus weighed 31 lbs., and although installed in five minutes only, worked efficiently at 40 miles. The messages were sent from the machine by Lieut. Beck, U. S. A., the director of the meet, and the whole test was conducted by the U. S. Signal Corps. This test disclosed the fact that it is possible to approximate the distances of aeroplanes by the use of the wireless apparatus.

M. Maurice Farman has also been experimenting with aeroplane wireless telegraphy at the Buc aerodrome. He has sent a message from his biplane a distance of six miles and anticipates greater success in future.

SHIP FLIGHTS.

In connection with Ely's flight from the *Birmingham*, recorded in my foregoing report, the following extract from an official report of that aviator's flight from the aviation field at San Francisco, Cal., to the U. S. S. *Pennsylvania* and return, on January 18, 1911, is interesting:

EXTRACT FROM THE REPORT OF THE COMMANDING OFFICER OF THE U. S. S. "PENNSYLVANIA," CAPTAIN C. F. POND, U. S. N.

A special platform had previously been erected on board at the Navy Yard, Mare Island, Cal., the construction of which is fully shown in the accompanying photographs. This platform, somewhat modified from the

one used by Mr. Ely in his flight from the U. S. S. *Birmingham* at Hampton Roads, Va., was 119 feet 4 inches in length, 31 feet 6 inches width in the clear, extending from the stern to the bridge-deck over the quarter-deck and after 8-inch turret, the forward end being 5 feet higher than the after end, and with a fantail of same width and 14 feet 3 inches in length sloping at an angle of about 30 degrees, over the stern. At the sides were fitted guard rails of 2-inch by 12-inch planking, and guide rails of 2-inch by 4-inch scantling, 12 feet apart, extended throughout its length. These guide rails, evidently intended to aid the aviator in determining his direction upon landing were of little or no use in that connection, but served a useful purpose in holding the lines connecting the sand bags at a proper height from the platform, though temporary blocks would have served equally as well. Every possible precaution was taken to insure the safety of the aviator. As fitted at the navy yard, the platform bore at its forward end a canvas screen extending from the platform to the temporary searchlight platform on the mainmast underneath the lower top, intended to catch the aviator and his machine should all other means fail, and, 10 feet from its forward end, a 2-inch by 12-inch plank extending across the face of the platform. These, and especially the plank, were very crude devices, and had they come into use would probably only have caused serious if not fatal injury to the aviator and his machine. Abaft the solid plank stop and spaced about 6 feet apart were fitted two canvas screens about 20 inches in height. These, together with the slight slope of the platform, were the only means provided in the original construction to check or stop the flight of the machine. It was very evident that something more was needed and after several consultations with Messrs. Curtiss and Ely, during which several schemes were considered and rejected, it was finally decided to adopt a system of sand bags such as had been successfully used to check automobiles at racing meets. Accordingly 22 pairs of bags were placed on the platform, each bag containing 50 pounds of sand, accurately weighed to insure uniformity of action, so as not to slue the machine, each pair being connected by a 21-thread line hauled taut across the face of the platform over the guide rails. These bags, spaced about 3 feet apart, covered about 75 feet of the length of the platform. As it turned out they were ample for the purpose and worked perfectly and none of the other devices were called into play. On either side of the platform, awnings were spread, extending to the life-boat davits, to catch the aviator should he be thrown over the edge of the platform. Life preservers were supplied and expert swimmers stationed, while boats lay off on either side for use in case of necessity.

The flying machine, a Curtiss biplane, had been fitted with a central skid, its lower face about 5 inches above the plane of the wheels on which the biplane stood when at rest, to which were attached three pairs of flat steel hooks intended to catch the lines connecting the sand bags. These hooks, though simple in design, were extremely ingenious. When in position, their points, which were about 4 inches in length and with 4-inch opening, lay in a horizontal plane parallel with the face of the skid and further precaution was taken to round the extreme points so that they might not

catch in the cracks of the platform. Their shanks were about 16 inches in length, and they were secured in pairs, one on either side of the skid, by a through bolt about 5 inches from the forward end of the shank. So fitted they hung point down to the rear and projecting about 4 inches below the lower face of the skid, further depression being prevented by a wire loop and the hooks made positive in action by a spiral spring at the forward end of the shank so that they might give upon hitting any undue obstruction such as might be encountered upon rising from the ground and would immediately automatically regain their proper position. It is only necessary to add that they functioned perfectly. The machine was further fitted with two metal air tanks, one on either side and with a hydroplane forward for use in case, through accident, the landing was made in the water. There were no other special fittings, and the machine landed on its rubber-tired wheels, as upon ordinary occasions. Ely himself wore a life preserver about his shoulders improvised from the inner tube of a bicycle tire.

The ship was riding to the flood tide with the wind, a light breeze of about 10 to 15 miles about three points on the starboard quarter, the most disadvantageous point, both accelerating the speed of the aeroplane and sweeping it off its course. The U. S. S. *Maryland* lay about 1000 yards, two points abaft our starboard beam, and the U. S. S. *West Virginia* about 500 yards on our port bow.

The flight from the aviation field at Tanforan, 10 miles distant in an air line, was made at a speed of about 60 miles an hour, as determined by the time of flight, and at an elevation of about 1500 feet. When about a half mile distant the aeroplane made a graceful dip, passing directly over the *Maryland* at an elevation of about 400 feet, then circling and continuing its descent passed over the bows of the *West Virginia* at an elevation of about 100 feet, and completing the turn at about 500 yards on our starboard quarter headed directly for the ship. When about 75 yards astern it straightened up and came on board at a speed of about 40 miles an hour, landing plumb on the center line, missing the first 11 lines attached to the sand bags—but catching the next 11, and stopping within 30 feet with 50 feet to spare, nothing damaged in the least, not a bolt or brace started, and Ely the coolest man on board. Hardly two minutes had elapsed from the time the aeroplane was first sighted, and no one had imagined he would make the landing on the first turn. The sand bags worked perfectly, stopping the machine, weighing, with the aviator, about 1000 pounds, with a speed of 40 miles an hour, within 30 feet, and, as Ely stated, with no perceptible jar. Six pairs of bags did the work, being hauled in over the guide rails close to the machine, the other five pairs being only slightly disturbed. The bags were caught, four on the first set of hooks, three on the second, and four on the third set. As the aeroplane came on board, the upward draft from the wind striking the starboard quarter of the ship lifted it bodily and gave it a slight list to port. This is plainly shown in the accompanying photographs. When the size and weight of the machine, its speed of approach, the elevation from which it descended, and the effect of the wind are considered, the mar-

velous skill, accuracy of judgment and quickness of brain of the aviator may be imagined. The slightest error of judgment meant serious, if not fatal, injury to both the aviator and his machine. Three feet more of elevation would have forced him to plunge directly into the canvas screen, and three to ten feet less elevation would have caused him to strike the fantail with consequences which can only be surmised.

The flight from the ship, an hour later, was comparatively tame. The aeroplane took the air easily, dipping to within about 10 feet from the surface of the water and then rising to an elevation of about 2000 feet over the city. Within a very few minutes Ely was back on the aviation field, landing within 10 feet of the starting line.

As a result of this experiment and of my observations on the aviation field, I desire to place myself on record as positively assured of the importance of the aeroplane in future naval warfare, certainly for scouting purposes. For offensive operations, such as bomb throwing, there has as yet, to my knowledge, been no demonstration of value, nor do I think there is likely to be. The extreme accuracy of control, as demonstrated by Ely, while perhaps not always to be expected to the same degree, was certainly not accidental and can be repeated and probably very generally approximated to. There only remains the development of the power and endurance of the machine itself, which, as with all mechanical things, is bound to come. There will be no necessity for a special platform. The flight away may be made either from a monorail or from a stay, and either from forward or aft, but preferably forward, while the return landing may be made on the water alongside, and the aviator and his machine afterwards brought on board. In fact, Curtiss has already demonstrated at San Diego the feasibility of not only landing upon the water, but under certain conditions the practicability of also flying from the surface of the water.

Photographs appended show the various stages of landing and departure and the details of the temporary platform used.

It was not originally contemplated to have this experiment require such a severe test of the aviator's skill. It was anticipated that the ship would steam out to sea, head to wind, at any desired speed, from 10 to 20 knots, under which circumstances the gradual approach of the aeroplane would have rendered the landing less difficult. But the test was arranged, as above described, by the officers of the Pacific Fleet to whom the details were entrusted, in co-operation with the Aviation Committee and in accordance with the wishes of the aviator.

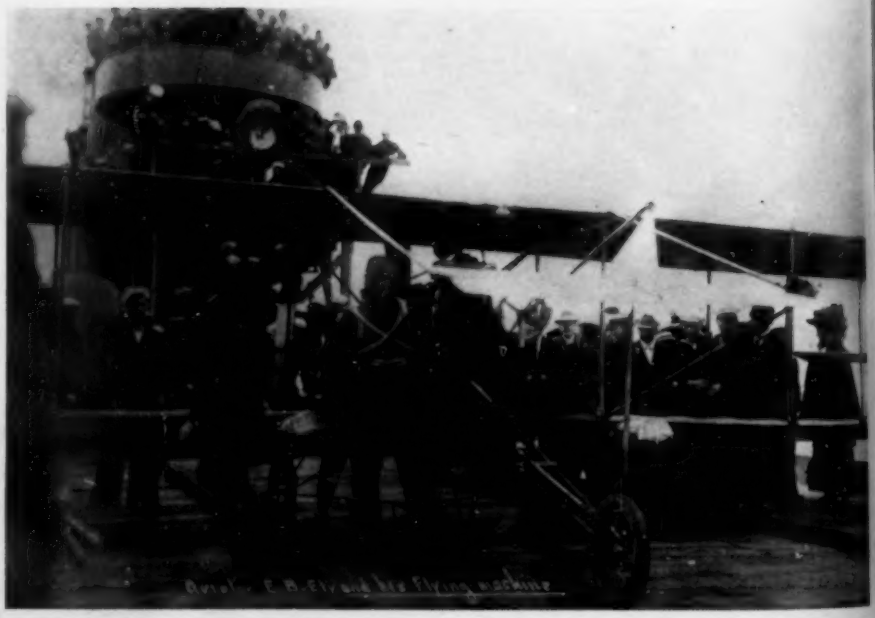
The following instructive remarks are taken from Ely's account of the flight:

There was never a doubt in my mind that I would effect a successful landing on the deck of the *Pennsylvania*. I knew what a Curtiss biplane would do, and I felt certain that if the weather conditions were good there would be no slip.

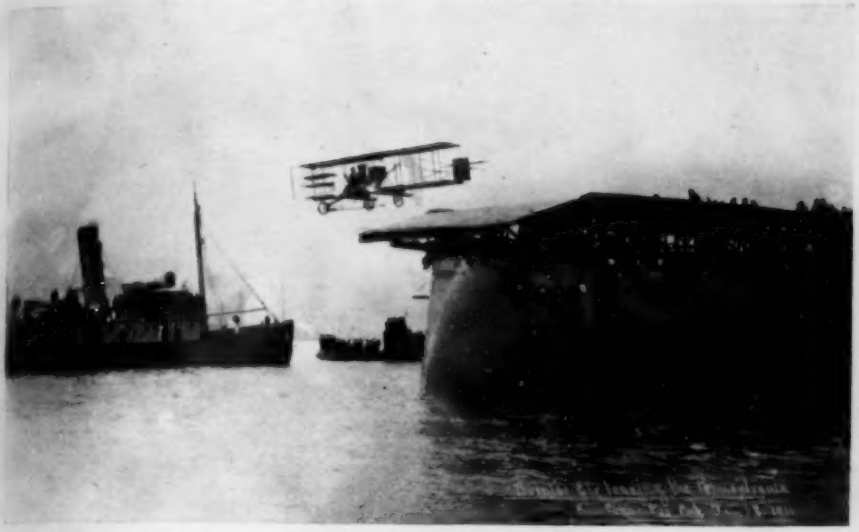
SHOWING LIFT AND LIST CAUSED BY UPWARD DRAFT OF WIND ON STARBOARD QUARTER.

PLUMB ON THE CENTER LINE. RIGHT WHEEL ELEVATED. HOOKS JUST ENGAGING NO. 11 PAIR OF BAGS AS SEEN BY BLACK BAG TO STARBOARD.

SHOWING ACTION OF SAND BAGS.



SHOWING SPECIAL DEVICES, VIZ. AIR TANKS, SKID WITH HOOKS AND HYDRO-PLANE, JUST ABAFT FRONT WHEEL.



EUGENE ELY LEAVING THE U. S. S. " PENNSYLVANIA " IN FLIGHT.
SIDE VIEW OF PLATFORM.

EUGENE ELY LEAVING THE PLATFORM ON U. S. S. " PENNSYLVANIA."
RETURNING TO SAN FRANCISCO.

The atmospheric conditions at the field appeared to be good, but, as I discovered after I got up in the air a few hundred feet, there was a good stiff breeze blowing.

The quality of the air was good. It was heavy and moist and of even pressure. The temperature was cold enough to make me uncomfortable, but I cannot say that the coldness was severe enough to incapacitate me or to interfere with the free use of all the members of my body.

As I came out over the bay above Hunters Point, I was about 1200 feet up. It was cloudy, smoky and hazy. I could not see the ships at first and did not locate them until I was within about two miles of them.

I was spinning along at about 60 miles an hour with the wind directly behind me, and when I sighted the *Pennsylvania* I saw that the stern was pointed into the wind, and when about a mile away I veered off to pass over what I supposed was the flagship *California*. As I neared her I dropped down from 1000 to about 400 feet in salute to the admiral. This ship, however, proved to be the *Maryland*, as the *California* was not in the bay, and I swung around the *West Virginia*, coming down to about 100 feet above the water, and pointed my machine for the *Pennsylvania*. I then made a sharp turn about 100 yards astern of that ship, gradually dropping down.

But there was an appreciable wind blowing diagonally across the deck of the cruiser, and I had to calculate the force of this wind and the effect it would have on my approach to the landing.

I found that it was not possible to strike squarely toward the center of the landing, so I pointed the aeroplane straight toward the landing, but on a line with the windward side of the ship. I had to take the chance that I had correctly estimated just how many feet the wind would blow me out of my course.

Just as I came over the overhang at the stern, I felt a sudden lift to the machine, as I shut down the motor, caused by the breaking of the wind around the stern. This lift carried me a trifle further than I intended going before coming in actual contact with the platform.

If anything I was brought to a stop a little too short and it probably would have been better to have had a little less weight in the sand bags.

The pneumatic life preserver that I had used during the flight from the *Birmingham* at Hampton Roads had proved cumbersome, interfering with the free use of my arms and legs, so on this occasion, I wore only a bicycle tube and found it was much better, as it did not hamper my movements at all.

AEROPLANES AND AVIATORS.

The following decisive and impartial opinion of Wilbur Wright on three types of aeroplanes and their future possibilities is of interest, in view of his accustomed reticence:

The *monoplane* is the ideal form for the *racing* machine, but the fault with this kind is that they have been built too small. The result is that they are very difficult to guide and that their stability is relative. To diminish the surfaces at the increase of speed results in lessening the

safety of the pilot. The *biplane* is heavier and consequently less rapid. Its construction is more difficult since we must take into consideration conditions which do not exist when there is one carrying surface. But its maneuvering is simpler and its stability greater. The *triplane* is almost an exaggeration. Its success in the future seems to me improbable. The addition of the third plane does not offer advantages for stability which deserve to be taken into consideration alongside of the inconveniences which it presents when we consider its resistance to forward motion."

Among the many useful fragments of advice left to us by the lamented John B. Moisant, is the following:

No man should build an aeroplane and then try to fly it unless he has had experience in the air. If the builder is also the inventor and desires to fly his invention, he should first have an experienced airman try it out for him. In other words, the machine should be tuned up by a capable aviator, for as it has been built, it may not be properly balanced or may have some defects to be found only by practical use of it.

Seamen will appreciate the force of this advice as the sailing of fast boats and yachts requires careful tuning up, by experienced seamen, after they are built and the risks involved in air craft are, of course, greater.

Up to the time of Ralph Johnstone's death, November 17, 1910, 22 aviators had perished during the year, not one of whom was an American. In the last half of the year 1910, out of nine who lost their lives four were Americans and out of 37 fatal accidents in the three years' history of aviation, 32 occurred during 1910.

It is notable, however, that not one death has occurred in the use of a Curtiss type machine. Henry Farman, whose machine is similar to the Curtiss, has never had a bad fall, although he has probably covered as much ground as any aviator now flying and has broken the record for sustained flight by being in the air 8 hours and 23 minutes.

Moisant said to a friend only a few days before his tragic death at New Orleans, December 31, 1910, "Most of the aviators who try for prizes will sooner or later get killed." It is a fact that most of the French aviators who have lost their lives in flying were out for prizes. Latham, who has had several falls caused by his own folly says that "*Imprudence* is the cause of the many deaths." To this I am inclined to add that the few deaths caused by defects in the machines have been due mainly to *carelessness*.

Although no aviator has as yet come to grief in an overtown flight, penalties will in future be inflicted by the Royal Aero Club

of the United Kingdom on all aviators who make unnecessary flights over towns, such flights being regarded as dangerous and useless in furthering the progress of aviation. This is the beginning of a safe and sound policy that it is hoped may be followed in America.

The circumstances attending the deaths of Hoxsey and Moisant have familiarized the public with the fact that all aviators recognize the peril of an atmosphere "full of holes" or a "swiss-cheese" air. Balloonists years ago discovered this phenomenon, especially near the earth's surface. The "holes" are regarded as spots of partial vacuum into which an aeroplane will fall, at times, a hundred feet or more. Of course, the vacuum theory is not strictly correct, but the term "holes" furnishes a convenient expression of an effect. Whatever the cause of the drop, it is apparent that at such times if a machine is not inherently well balanced there is grave danger. I refer to this as a possible explanation of the cause of the fatal accidents to Moisant and Hoxsey, the unknown cause of which has given rise to many theories. The two machines used were a Bleriot monoplane and a late-model Wright biplane. Neither of these machines are operated with a front control elevator and it seems reasonable to suppose that the sudden upward pressure, resulting from such a drop, acting effectively under the rear control elevator of the Wright and the rear control and rear plane of the Bleriot at the end of a long lever, the comparatively light tail, was sufficient, in both cases, to throw the tail up to the danger point, thus causing the machines to revolve suddenly about their centers of mass situated near the front ends.

Neither Curtiss nor Farman have removed their front control elevators and it is hoped that they will not do so until this phase of the balance has been thoroughly investigated.

After the above was written it came to my knowledge that J. A. D. McCurdy, during a recent flight over Havana in a very gusty wind was seen to drop suddenly, near Camp Columbia, about 400 feet. He rode a Curtiss biplane and probably found the front control a saving factor on that occasion.

In the amazing list of flying machines that have successfully flown, it is notable that already certain distinct types have become standard and it is probable that further departures from standard types will be made only in step by step processes and not in wide departures from prevailing theories.

The main object of new designers seems, naturally, to provide as nearly as possible an "automatic stability," or at least to get a machine that can be maintained in balance during flights with the least amount of skill on the part of the the aviator. It is also apparent from a glance at many new designs that a low center of gravity is regarded as a means to this end, but an inspection of the standard types shows a preference by experienced designers for a high center of gravity and a comparison of the performances indicates that those having a high center of gravity are steadier in flight and easier to control.

The reason for this is explained, as follows, by Lieut. P. W. Wilcox, U. S. A. R. in *The Airscout* for January, 1911:

An aeroplane is necessarily a very light structure having large surfaces which are necessary to sustain it in flight. The engine, the gasoline and oil tanks, the radiator and passengers, form the bulk of the weight and in a very concentrated form, so that the center of gravity depends upon the center of mass formed by these heavy weights. The rest of the machine being very light has practically no inertia, so that when the machine in flight meets a disturbance in the air such as a side current, if the surfaces above and below the center of mass are not equal the machine will tend to rotate about this center of mass. If the center of gravity be so placed that it is in the center of the machine the tendency to rotate will be neutralized and the side currents will not appreciably affect the balance of the machine. It has often been said that even if a low center of gravity machine be unbalanced by a side current, it would regain its balance before falling any appreciable distance by the parachute effect of the low center of gravity. However, when a machine starts to fall, it almost invariably falls forward directly down, if the rudders are in the rear, so that the sutaining effect of the planes does not amount to anything.

FOREIGN ACTIVITY.

Nearly all countries on the face of the globe are now showing marked interest in aviation and are endeavoring to keep abreast of the times in its development. The greatest activity, however, continues in France, which country evidently intends to increase her lead in the progress of this new art. The Director of the French Military Aviation Service has recommended that the already numerous number of aerodromes be increased through government grant and the French Senate has formed a special Department of Aviation to act conjointly with well known aviators and aeronauts with the idea of furthering aeronautics generally.

A recent test of the new Maurice Farman biplane at Buc resulted in this type machine being adopted by the French Army. This is

specially interesting in view of the success that has attended the distinctly French types of monoplanes in the various contests during the past year. This Farman biplane exceeded the requirements of the specifications by rising from the ground to a height of 300 meters within six minutes and attaining a speed of more than 80 kilometers per hour.

A recent combined flight of an aerial fleet from Pau to Tarbes and return created a distinct military impression. Five Bleriot monoplanes left the aerodrome at Pau in line formation. Four were military machines driven by three army lieutenants and one navy lieutenant. One was driven by a civilian aviator. The flight to Tarbes was led by the naval officer, but the return flight was led by an army officer and it is reported that they "circled over the crowd maneuvering like a squadron at sea."

Great activity in aviation is also promised in Germany. A number of notable cross-country flights have taken place. Military machines are being tested, military experts are being instructed in aviation and an aviation school at Mulhouse, in Alsace, the home of the Aviatik machine, is making good progress.

The Emperor's brother, Prince Henry, obtained a pilot's license in an Aviatik biplane on November 19, 1910, after having been a student of aeronautics for two years, and it is reported from Berlin that the Emperor contemplates holding a review shortly, of those German officers who have qualified as aviators.

An "aerial torpedo," invented by a Swedish officer, will soon be tested at the Krupp works. It is said to be very light, to have a range of three miles and a velocity of 150 feet per second increasing to 1500 feet per second. It is to be launched by a special apparatus and to carry an explosive charge of two and a half pounds. Presumably it belongs to the rocket type but its use has not been explained as yet.

In England, which has been somewhat backward in its encouragement of aviation, there were 50 licensed aviators on December 31, 1910. An aeronautical reserve such as has been formed in the United States, is being organized under the auspices of the Royal Aero Club of the United Kingdom. This club has placed at the disposal of naval officers two biplanes fitted with Gnôme motors and has deputed a skilled aviator to instruct naval officers in their operation.

It is notable that one of the new Paulhan biplanes has been bought by the British authorities without previous test. Since its purchase, however, some cross-country flights and some altitude and endurance tests have been made with it, including one flight of one and a half hours duration.

The peculiar construction of the Paulhan biplane permits it to be packed in a crate measuring 15′ 6″ x 3′ 3″ x 3′ 3″ notwithstanding the fact that its length is 25′ 6″ and its spread 38′.

The first Japanese to win his pilot license (No. 283), was Takygana Yoshitooki. He used a Farman biplane.

HYDRO-AEROPLANES.

The interesting hydro-aeroplane of M. Henri Fabre, which possesses the salient constructional features of Paulhan's biplane, is the first heavier than air machine that has made successful flights starting from and alighting on the water. Its first series of flights were made on May 17, 1910 and recent tests have demonstrated all that is claimed for it. It is fitted with a 50 h. p. Gnôme motor and a two bladed Chauviere propeller.

Mr. Glenn Curtiss was probably the first to experiment with hydroplanes attached to an aeroplane. His experiments, commenced on Lake Keuka at Hammondsport more than a year ago, have recently culminated in successful flights from the water and in alighting on the water at San Diego, Cal. In the preparation for these flights he has simply applied to one of his old standard machines the requisited floating power, by attaching extemporized hydroplanes, with a view to studying the attachments necessary to convert his machine into an effective hydro-aeroplane capable of alighting on and starting from either land or water.

The advantages of this to the navy are apparent when it is considered that successful practice and instruction in aviation requires a suitable aerodrome and that any ship equipped with aeroplanes may now utilize the smooth waters of any harbor for such purposes.

On February 17, 1911, the U. S. S. *Pennsylvania* being in the vicinity of San Diego, Cal., Mr. Glenn Curtiss flew from North Island to that ship and landed on the water alongside. His aeroplane was hoisted on board and later was hoisted out when he quickly arose from the water and flew back to North Island.

Mr. Curtiss has kindly offered to instruct officers in the use of

MR. GLENN H. CURTISS ALONGSIDE U. S. S. " PENNSYLVANIA," SAN DIEGO, CAL. HOOKING ON NO. 2 HYDRO-AEROPLANE, PREPARATORY TO BEING HOISTED ON BOARD.

MR. GLENN H. CURTISS BEING HOISTED, WITH HIS HYDRO-AEROPLANE NO. 2, ON BOARD U. S. S. " PENNSYLVANIA."

MR. GLENN H. CURTISS IN HIS FIRST HYDRO-AEROPLANE AT SAN DIEGO, CAL.

MR. GLENN H. CURTISS IN HIS SECOND HYDRO-AEROPLANE AT SAN DIEGO, CAL. IN FLIGHT TO U. S. S. "PENNSYLVANIA."

his machines and Lieut. Ellyson, U. S. N., now under instruction, has already made successful flights. Ensign Charles F. Pousland, U. S. N., will also be ordered to this duty.

The following information is gleaned from a report of Mr. Curtiss' aeroplane visit to the *Pennsylvania*, by Lieut. Ellyson:

The water was smooth with light northwest airs, and there was a current running at about 4 knots per hour. No special preparations were made on board the *Pennsylvania*, except to lower one boat, in order that there would be sufficient room to land the machine on the superstructure deck.

The aeroplane used was a standard Curtiss 8-cylinder machine with front control removed and fitted with a pontoon instead of wheels. The engine used was rated at 50 horse-power when making 1200 r. p. m., and was fitted with a traction propeller 7 feet in diameter. The use of a propeller in front, which was experimental, obscured the vision somewhat and rendered the machine less easily controlled. This will not be used in future, as there is no difficulty in performing this same maneuver with the front control in place and the propeller mounted in rear of the planes.

A wherry and a dinghy were used to make fast the steadying lines, and no difficulty whatever was experienced in hoisting the machine both in and out, as will be seen by the photographs appended.

Encouragement is being given to the development of hydro-aeroplanes in Switzerland by the offering of a $2000 prize, the "Eyenard prize," for an all-Swiss aeroplane piloted by a Swiss aviator which shall make the best time in a flight from one end of Lake Geneva to the other, alighting on the water three times. Each start from the water must be made within a distance of 1000 meters and none of the stops must be longer than 30 minutes.

This will doubtless provide an additional attraction for tourists and will be a long stride in the direction of aqua-aerial yachting, as the dangers of a fall will be minimized.

I regard the introduction of the hydro-aeroplane as one of the most important steps in the rapid development of aviation that has yet been undertaken.

WHAT HAS BEEN ACCOMPLISHED.

Ely has proved that an aeroplane can leave a ship and return to it, even with crude preparations that may be readily improved upon for practical work. Others have demonstrated that an aeroplane can remain in flight for a long time, from five to eight hours or more. Others have demonstrated that observations can be made from great altitudes, that photographs can be taken, that recon-

noissances can be made, that messages can be sent and received by wireless telegraph, that passengers can be carried, that the aeroplane may be stowed on board in suitably dimensioned crates or boxes and readily assembled for use in less than one hour, and that it is possible to hoist an aeroplane out and in, as you would a ship's boat, to exercise it over smooth water. Mr. Curtiss has also recently demonstrated that it is not necessary for the water to be smooth.

This has all been done within a year and mostly, in a few months, since the date on which the navy first began to take serious notice of the possibilities in aviation. In this short space of time many new ideas for improvement in the aeroplane for naval service and in the accessories necessary for naval use have been brought to the eve of development and there is reason to believe that after a little of our anticipated experience with this auxiliary in the navy, its spheres of usefulness will be generally acknowledged.

Atmospheric conditions still govern these performances to a great extent, but the perfect calm that was necessary a few years ago is no longer required and fresh breezes do not now deter even the most prudent of aviators.

The aeronautical exhibition held at Boston February 20-25, 1911, although less extensive than that held at Paris in October, 1910, clearly showed that great improvement in the character of aeroplane craftsmanship has been made, in this country, within the last six months. The workmanship on the new machines compares favorably with that of the best French machines exhibited during the meet at Belmont Park.

The manufacture of aeronautical accessories has become an established industry in the United States and it is now possible for anyone desiring to construct an aeroplane to buy from many firm nearly all the parts of successful machines, ready prepared in accordance with proved standards. This standardization makes for safety in the use of such parts as spars, struts, ribs, surfaces, braces, wires, turn-buckles, bolts and joints.

There has been notable progress also in the manufacture of aeroplane motors and their accessories, especially in those of the revolving type. Although some have not been thoroughly tested in flight, several appear to embody distinct improvements over the celebrated "Gnômes." The improvement of the two-cycle engine was also a notable feature at the Boston show, and it would seem

that a reasonable certainty of action, or reliability sufficient for aerial navigation, is now practically assured.

For the information of officers interested in becoming proficient in aviation the following requirements are noted:

RULES AND REGULATIONS FOR THE ISSUE OF PILOTS' LICENSES.

Applicants must pass the three following tests:

(A) Two distance tests, each consisting in covering, without touching the ground, a closed circuit of not less than five kilometers in length.

(B) An altitude test consisting in rising to a minimum height of 50 meters above the starting point.

(C) The (B) test may be made at the same time as one of the (A) tests.

The course over which the aviator shall accomplish the aforesaid circuits must be indicated by two posts situated not more than 500 meters from each other.

After each turn made around a post the aviator will change his direction so as to leave the other post on his other side. The circuit will thus consist of an uninterrupted series of figure eights, each circle of the figures alternately encircling one of the posts. The distance credited over the course covered between the two turns shall be the distance separating the two posts.

For each of the three tests the landing shall be made:

(1) By stopping the motor not later than the time when the machine touches the ground.

(2) At a distance of less than 50 meters from a point designated by the applicant before the test.

GENERAL DETAILS

Nation.	Pilot and Make of Flyer.	Length over all.	Breadth over all.	Supporting Surface (sq. ft.)	Wings.		Rudders.	
					Spread.	Chord.	Vertical.	Horizontal.
France	Alfred le Blanc, Bleriot (100 Gnôme).	23′	28′	150 (ap.)	12′ 6″ (each)	6′ 6″	2′ 11″ x 3′	38″ x 35″
France U. S.	Alfred le Blanc, Bleriot (XI Bis.) (sold to Moisant).	23′	28′	160 (ap.)	13′ 6″ (each)	6′ 6″	2′ 11″ x 3′	38″ x 35″
U. S.	J. B. Moisant, Bleriot (2 seat).	22′	32′	210 (ap.)	15′ (each)	7′	Oval shape	2 semi-circular flaps
U. S.	J. B. Moisant, Bleriot (XI Bis.)	23′	28′	160 (ap.)	13′ 6″ (each)	6′ 6″	2′ 11″ x 3′	38″ x 35″
U. S.	J. A. Drexel, Bleriot (XI Bis.)	23′	28′	160 (ap.)	13′ 6″ (each)	6′ 6″	2′ 11″ x 3′	38″ x 35″
Eng.	Jas. Radley, Bleriot (XI Bis.)	23′	28′	160 (ap.)	13′ 6″ (each)	6′ 6″	2′ 11″ x 3′	38″ x 35″
Eng.	C. Grahame-White, Bleriot (100 Gnôme).	23′	28′	150 (ap.)	12′ 6″ (each)	6′ 6″	2′ 11″ x 3′	38″ x 35″
Eng.	C. Grahame-White, Bleriot (XI Bis.)	23′	28′	160 (ap.)	13′ 6″ (each)	6′ 6″	2′ 11″ x 3′	38″ x 35″
Eng.	W. B. McArdle, Bleriot (XI Bis.)	23′	28′	160 (ap.)	13′ 6″ (each)	6′ 6″	2′ 11″ x 3′	38″ x 35″
France	René Barrier, Bleriot (XI Bis.)	23′	28′	160 (ap.)	13′ 6″ (each)	6′ 6″	2′ 11″ x 3′	38″ x 35″
France	René Simon, Bleriot (XI Bis.)	23′	28′	160 (ap.)	13′ 6″ (each)	6′ 6″	2′ 11″ x 3′	38″ x 35″
France	Emile Aubrun, Bleriot (XI Bis.)	23′	28′	160 (ap.)	13′ 6″ (each)	6′ 6″	2′ 11″ x 3′	38″ x 35″
France	Roland Garros, Santos-Dumont, "Demoiselle."	20′	18′	100 (ap.)	18′	6′ 6″	Combination vert. and hor. rudder.	
Switz.	E. Audemars, Clement Bayard, "Demoiselle."	20′	18′	100 (ap.)	18′	6′ 6″	Combination vert. and hor. rudder.	
France	Count J. de Lesseps, Bleriot (2 seat).	22′	32′	210 (ap.)	15′ (each)	7′	Oval shape	2 semi-circular flaps.
France	Count J. de Lesseps, Bleriot (XI Bis.)	23′	28′	160 (ap.)	13′ 6″ (each)	6′ 6″	2′ 11″ x 3′	38″ x 35″
France	Hubert Latham, Antoinette Racer.	42′	40′	...	19′ (each)	8′ 6″ to 7′	2 triangular	1 triangular rudder
France	Hubert Latham, Antoinette (50 H. P.)	42′	46′	377	22′ (each)	8′ 6″ to 6′ 6″	2 triangular	1 triangular rudder

OF MONOPLANES.

Tail.			Motor.				Propeller.			
Fixed Horizontal Surface.	Lateral Stability.	Landing Chassis.	Make.	H. P.	Cooling.	Igniting	Make.	Blades.	Diameter.	R. P. M.
9′ x 35″	Warping	2 castor wheels & skid	Gnôme, 14 cyl.	100	Air	Bosch	Régy Frères	2	7′11″	1300
9′ x 35″	Warping	2 castor wheels & skid	Gnôme, 7 cyl.	50	Air	Bosch	Chauvière	2	7′ 6″	1200
Flat triangular	Warping	3 castor wheels	Gnôme, 7 cyl.	50	Air	Bosch	Chauvière	2	7′ 6″	1200
9′ x 35″	Warping	2 castor wheels & skid	Gnôme, 7 cyl.	50	Air	Bosch	Chauvière	2	7′ 6″	1200
9′ x 35″	Warping	3 castor wheels	Gnôme, 7 cyl.	50	Air	Bosch	Chauvière	2	7′ 6″	1200
9′ x 35″	Warping	2 castor wheels & skid	Gnôme, 7 cyl.	50	Air	Bosch	Chauvière	2	7′ 6″	1200
9′ x 35″	Warping	2 castor wheels & skid	Gnôme, 14 cyl.	100	Air	Bosch	Chauvière	2	7′11″	1300
9′ x 35″	Warping	2 castor wheels & skid	Gnôme, 7 cyl.	50	Air	Bosch	Chauvière	2	7′11″	1300
9′ x 35″	Warping	3 castor wheels	Gnôme, 7 cyl.	50	Air	Bosch	Chauvière	2	7′ 6″	1200
9′ x 35″	Warping	2 castor wheels & skid	Gnôme, 7 cyl.	50	Air	Bosch	Chauvière	2	7′ 6″	1200
9′ x 35″	Warping	2 castor wheels & skid	Gnôme, 7 cyl.	50	Air	Bosch	Chauvière	2	7′ 6″	1200
None	Warping	2 wheels & skid	Clement Bayard, 2 cyl.	30	Water	Bosch	Chauvière	2	6′ 6″	1100
None	Warping	3 wheels	Clement Bayard, 2 cyl.	30	Water	Bosch	Chauvière	2	6′ 6″	1100
Flat triangular	Warping	3 castor wheels	Gnôme, 7 cyl.	50	Air	Bosch	Chauvière	2	7′ 6″	1200
9′ x 35″	Warping	2 castor wheels & skid	Gnôme, 7 cyl.	50	Air	Bosch	Chauvière	2	7′ 6″	1200
Large triangular	Warping	2 wheels & skid	Antoinette, 16 cyl.	100	Water	Bosch	Normale	2	7′11″	1200
Large triangular	Warping	2 wheels & skid	Antoinette, 8 cyl.	50	Water	Bosch	Normale	2	7′11″	1200

GENERAL DETAILS

Nation.	Pilot and Make of Flyer.	Length over all.	Breadth over all.	Supporting Surface (sq. ft.)	Wings.		Rudders.	
					Spread.	Chord.	Vertical.	Horizontal.
U. S.	H. S. Harkness, Antoinette (2 seat).	42′	46′	377	22′ (each)	8′ 6″ to 6′ 6″	2 triangular	1 triangular rudder
U. S.	H. S. Harkness, Antoinette (1 seat).	42′	46′	377	22′ (each)	8′ 6″ to 6′ 6″	2 triangular	1 triangular rudder
U. S.	Glenn H. Curtiss (single surface).	25′	26′	130	20′	5′	4′ x 3′	3′ x 1′ (flap)

DETAILS OF

U. S.	C. F. Willard Curtiss (special).	34′	32′	300	32′	5′	3′4″ x 2′ 8″	7′ x 3′ (Biplane)
U. S.	Eugene Ely, Curtiss.	28′	20′	263	26′	4′ 6″	3′ x 2′ 4″	6′ x 2′ (Biplane)
U. S.	J. C. Mars, Curtiss.	28′	26′	263	26′	4′ 6″	3′ x 2′ 4″	6′ x 2′ (Biplane)
U. S.	J. A. D. McCurdy, Curtiss.	28′	26′	263	26′	4′ 6″	3′ x 2′ 4″	6′ x 2′ (Biplane)
U. S.	J. F. Frisbie, Curtiss type.	28′	26′	263	26′	4′ 6″	3′ x 2′ 4″	6′ x 2′ (Biplane)
U. S.	C. H. Hamilton, Hamiltonian.	30′	31′	310	31′	5′	4′ x 3′	7′ x 3′ (Biplane)
U. S.	C. K. Hamilton, Hamiltonian.	28′	26′	263	26′	4′ 6″	3′ x 2′ 4″	6′ x 2′ (Biplane)
Eng.	C. Grahame-White, Farman.	38′	33′	429	33′	6′ 6″	Two	6′ x 2′ 6″ and flap
U. S.	C. B. Harmon, Farman (modified).	33′	33′	429	33′	6′ 6″	Two	6′ x 2′ 6″ and flap
U. S.	Walter Brookins, Wright racer.	19′6″	21′6″	146	21′ 6″	3′ 6″	Twin vertical rudder	8′ x 2′
U. S.	Ralph Johnstone, Wright.	....	30′	485	30′	6′ 2″	Twin vertical rudder	12′ x 30′
U. S.	Arch. Hoxsey, Wright	....	30′	485	30′	6′ 6″	Twin vertical rudder	12′ x 30′
U. S.	R. Johnstone, Wright high flyer.	19′6″	20′	180	20′	3′ 6″	Twin vertical rudder	8′ x 3′
Eng.	Alec. Ogilvie, Wright roadster.	19′6″	22′	150	22′	3′ 6″	Twin vertical rudder	8′ x 2′
U. S.	P. O. Parmelee, Wright.	....	30′	485	30′	6′ 6″	Twin vertical rudder	12′ x 30′
U. S.	Tod. Sohriver, Curtiss type.	30′	31′	310	31′	5′	4′ x 3′ (approx.)	7′ x 3′ (single)

OF MONOPLANES.—*Continued.*

Tail.	Lateral Stability.	Landing Chassis.	Motor.				Propeller.			
Fixed Horizontal Surface.			Make.	H. P.	Cooling.	Igniting.	Make.	Blades.	Diameter.	R. P. M.
Large triangular	Warping	2 wheels & skid	Emerson, 6 cyl.	50	Water	Bosch	Antoinette (metal)	2	7′ 6″	1200
Large triangular	Warping	2 wheels & skid	Antoinette, 8 cyl.	50	Water	Bosch	Antoinette (metal)	2	7′ 6″	1200
6′ x 1′ 6″ (fixed)	Ailerons	3 wheels	Curtiss, 8 cyl.	60	Water	Bosch	Paragon	2	7′	1200

BIPLANES.

7′ x 27″	Ailerons	3 wheels	Curtiss, 8 cyl.	60	Water	Bosch	Curtiss	2	7′	1200
6′ x 25″	Ailerons	3 wheels	Curtiss, 8 cyl.	60	Water	Bosch	Curtiss	2	7′ 6″	1250
6′ x 25″	Ailerons	3 wheels	Curtiss, 8 cyl.	60	Water	Bosch	Curtiss	2	7′ 6″	1250
6′ x 25″	Ailerons	3 wheels	Curtiss, 8 cyl.	60	Water	Bosch	Curtiss	2	7′ 6″	1250
6′ x 25″	Ailerons	3 wheels	Hall-Scott, 8 cyl.	60	Water	Bosch	Hall	2	8′	1100
7′ x 25″	Ailerons	3 wheels	Hamiltonian, 8 cyl.	110	Water	Bosch	Charavay	2	7′11″	1100
6′ x 25″	Ailerons	3 wheels	Hamiltonian, 8 cyl.	60	Water	Bosch	Charavay	2	8′	1100
Biplane	Ailerons	4 wheels & skids	Gnôme, 7 cyl.	50	Air	Bosch	Chauvière	2	8′	1200
Biplane	Ailerons	4 wheels & skids	Gnôme, 7 cyl.	50	Air	Bosch	Regua-Gibson	2	8′	1200
None	Warping	4 wheels & skids	Wright, 8 cyl.	60	Water	Mea	Wright (two)	2	8′ 6″	500
None	Warping	4 wheels & skids	Wright, 4 cyl.	30	Water	Mea	Wright (two)	2	8′ 6″	450
None	Warping	4 wheels & skids	Wright, 4 cyl.	30	Water	Mea	Wright (two)	2	8′ 6″	450
None	Warping	4 wheels & skids	Wright, 4 cyl.	30	Water	Mea	Wright (two)	2	8′ 6″	450
None	Warping	4 wheels & skids	Wright, 4 cyl.	30	Water	Mea	Wright (two)	2	8′ 6″	450
None	Warping	4 wheels & skids	Wright, 4 cyl.	30	Water	Mea	Wright (two)	2	8′ 6″	450
7′ x 30″	Ailerons	3 wheels & skid	Kirkham, 6 cyl.	40	Water	Bosch	Charavay	2	7′	1200

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

TRAINING OF THE PERSONNEL OF THE FLEET FOR BATTLE.

By REAR-ADMIRAL A. C. DILLINGHAM, U. S. Navy.

Success in battle is the ultimate object of our training, so that a progressive system is necessary, culminating in the greatest efficiency when engaged in battle. Our fleet *is* progressing, it is assuming more and more a military character with the fleet policy of to-day, when it seems possible to keep the fleet assembled for training, avoiding the demoralizing effects of long and unnecessary delays at navy yards, and frequent interruptions in using the fleet for other than military purposes. It is acknowledged that our present system of training recruits at training stations is giving good results, while the commander-in-chief of the battle fleet has instituted progressive training for the enlisted personnel in fleet, which is far in advance of anything ever undertaken before, and sure to give good results; the time spent at Guantanamo by the fleet, with the admirable routine for training, should advance the enlisted personnel in a general knowledge of its business. We must not forget that with 76 per cent of our men on their first enlistment, much more time must be occupied with training than would be the case if we had a larger continuous service force. Were 76 per cent of our men continuous service men the question of their training would be greatly simplified, for continuous service men should mean trained men. It would seem that we are doing the best possible for the enlisted personnel. Let us now consider the commissioned personnel.

With the routine for drills, etc., aboard ship the junior officers, having professional zeal, must progress. The battleship, scouts, destroyers, tropedo-boats, submarines and aeroplane, give to these officers the very best of training. The captains when in fleet are studying the tactical value of their ships, and with the experience

of frequently getting under way, coming to anchor, at target practice and in cruising in formation or separately, with frequent opportunities for handling their ships separately, they should be au fait in the school of the ship, while battle drills are preparing them for junior flag rank. All officers of command rank should have a course at the war college, and this, if possible, before taking a command afloat, and the captain who is eligible to flag rank in fleet should not have shore duty other than at the war college. With our present system of promotion there are many captains who have no possibilty of being in fleet with flag rank. It is from such captains that details for navy yards and other shore duty should be made. It would seem that there is every reason to expect efficiency from our officers up to flag rank, but there does not seem to have been made any effort to develop the efficient flag officer who should be the head, the brains to lead our fleet to battle. There must be a school in fleet for flag officers; they must have more training, must be given the opportunity, under as nearly as possible battle conditions, to get the necessary experience, and to develop whether or not they are actually capable of performing the service that may be required of them.

In our service, if one's health and morals are good, it is not difficult to reach flag rank, but have all who reach this position the natural capacity for the duty required? We must have the best, and this can only be assured by giving to flag officers the opportunity to develop what may or may not be in them. At present flag duty in fleet seems to be due to accident of birth, rather than tried efficiency. It is found at the war college that certain officers develop a keen faculty as tacticians, others have aptitude for strategetic work. Some officers in obtaining initial positions, for instance, can at once set the course and formation, while others are undecided, and fail to grasp the situation. The former will gain the advantage, while the latter may lose the opportunity for success. Some officers upon being given a problem, with the chart before them, can at once locate the position of strategic advantage, while others less keen find great difficulty in making a decision. The school for flag officers should develop the best, which are the ones we must have. So far the commander-in-chief has assumed a position which not only prevents him from having the experience which he should have in order to properly conduct the fleet in battle, but which deprives the junior flag officers of the training which they must have in order to become efficient. In

foreign services the greatest importance is attached to the training of flag officers; they are sent afloat for a year's training and relieved by others, so that the government, in time of peace, may be able to select the most efficient for the purposes of war.

Our division commanders have complained that they did practically nothing in fleet; that they were without responsibility or opportunity for practice; that they were learning nothing comparatively. This condition arises in a great measure from having the commander-in-chief in formation, in command of a division. There is no tactical reason why a commander-in-chief should be in formation. In time of peace there is every reason why he should not be in formation. It is understood that the Department contemplates placing a division commander for each division, with the commander-in-chief out of formation. This, with a proper system of training for flag officers in battle work, will supply a want that has been sadly needed in fleet, and should develop flag officers fit for service in time of war. In the school for flag officers the methods should pertain only to the actual conditions of battle. A flag officer should have the experience in the practical handling of his force under battle conditions, as for instance, with his force organized as for war and operating against another force, he should seek advantage in initial position, and so conduct his force that he shall maintain the advantage with the least possible change in the rate of change of range. How easy it is to write such a phrase, "Seek initial position and so conduct his force that he shall maintain the advantage with the least possible change in the rate of change of range."

This is battle tactics. This is the practical business of the flag officer. What a tremendous responsibility he has. Consider the approach of two modern fleets and try to realize the responsibility resting upon the commander-in-chief and the junior flag officers. Should an officer be allowed to accept such responsibility without having had the proper training? And when we consider that efficiency or inefficiency may mean success or defeat of our fleet, is it a wonder that our flag officers demand that they be given the opportunity for practical experience, that they may be able to make good when called upon. If we are to maintain a fleet upon the supposition that war may come at any moment, are we not bound to develop at once the efficient flag officer to conduct the fleet in battle? Let us suppose war within three or six months, we can depend upon our enlisted personnel, but where are the flag officers

who have had the training necessary to conduct our forces? We shall have to compete with flag officers who have had training as such. It would seem to be a serious and alarming condition, demanding immediate steps to be taken to secure proper battle training for our flag officers. Look over the list of flag officers available for war purposes, can we find one who has had training, one who has had the experience in battle work so absolutely necessary? The present commander-in-chief will soon reach the age limit, is it not a matter of regret that the exigencies of the service required his prospective successor to leave the fleet for shore duty, causing him to lose the practical training preparatory to assuming such responsibility.

This new commander-in-chief must now rid his mind as soon as possible of all thought of navy yard administration and assume the serious responsibilities of commander-in-chief without any preliminary battle training. In time of peace his is a difficult position. Can we imagine a more difficult position or a more serious one in the event of an early war, or one which might give the country greater anxiety? It would seem far better from a practical view point to continue the present commander-in-chief with his experience, regardless of his retirement, if he is taken out of formation, and the junior flag officers given the training in battle tactics, preparatory to a selection for commander-in-chief. Till lately, we have never been able to get beyond a preliminary stage in battle tactics. This has been due in the past to the frequent changes of commanders-in-chief, and the lack of any progressive system for training flag officers; and recently to the fact that the commander-in-chief has apparently assumed the duties of commander-in-chief, squadron and division commander. There has never been systematic training of junior flag officers, our squadrons have never been sufficiently exercised in actual battle practice. I do not criticize the commander-in-chief. No doubt conditions existed which prompted a different course. The fact that our division commanders have lately been pitted against each other shows his appreciation of the necessity for such training.

As the school for flag officers should be put in operation it is well to consider how best to conduct the school. Let the problem for the school for our flag officers be, *war with the most probable enemy of to-day*, and for the purpose of training our flag officers, instead of operating our squadrons or divisions against each other, let us make the other as nearly as is possible tactically equal to a

similar force of the most probable enemy of to-day. Bring to the fleet all the offensive auxiliaries, such as scouts, destroyers, torpedo-boats, submarines and aeroplanes. Put these forces out of touch, under the command alternately of the junior flag officers. Declare then a state of war, and require the junior flag officers to conduct their forces. We shall then have information, the approach, in touch and to battle. In getting probable results we could use the scores made by our own ships at their last battle practice, and for the most probable enemy's ships the information, positive or assumed, upon the subject. These exercises should be had as frequently as is possible and under all possible conditions of sea room and weather. The commander-in-chief should prescribe the conditions, and a report in detail of every movement and incident, from the declaration of war to the end of the exercises, should be submitted as a test of the capacity and efficiency of the flag officers engaged. With the administration of the units of the fleet, it would seem that the commander-in-chief need not be concerned further than to know when any unit of his fleet is not able to obey at once any signal he may make.

Let the responsibility for preparedness and efficiency be with the division commander, to the squadron commander and from the squadron commander to the commander-in-chief. Develop as soon as possible the individuality of the flag officer, his capacity and his talents, his general worth for assuming the great responsibility which must devolve upon him as commander-in-chief.

The practical business of the fleet is to capture or destroy the vessels of any enemy which it is its duty to encounter. Ideal conditions would exist, if the fleet were of such a composition, and in such a state of efficiency, as to meet the demands of any national policy, and able to compete, successfully, in battle, with all comers; but no such conditions exist, and to-day, during this era, the practical question is, how to use the force that is actually at our disposal, so as to be able to successfully compete with the force of the most probable enemy of to-day. We know exactly what force we have available, and what additions to this force are actually in sight and available for the immediate future, and, considering the political aspect of the world, we may decide which nation is the most probable enemy. Our whole business is to follow such a fleet policy as will prepare this force actually existing, to capture or destroy the vessels of this most probable enemy, and a consideration of any policy, exercise, drill or maneuver that has

not to do directly with these conditions is a waste of time. In handling this force the only axioms and theories of naval tactics that are of any use for our purpose, are those that will apply to our present conditions of having a definite force to deal with a definite enemy; all other considerations are foreign to the practical business of the fleet and until our forces are, in all respects, ready to fight this most probable enemy, we are deficient. The general study, by officers of the service, of naval policy, strategy, and tactics, is the natural consequence of an increase of material. With the organization of our force, officers are led to consider the best methods of handling this force, and the result has been numerous articles bearing upon this most important subject of naval tactics, all of which shows a proper trend of thought in professional channels. The broad study of naval tactics is essential to the making of a capable commander. He should study the theories, and consider the axioms in naval tactics, with a view to applying them when required to do so, but for the practical purposes of the fleet to-day only such theories and axioms as apply to our present conditions, where we are considering the handling of a specific force, against this specific force of our most probable enemy, are of any practical use. The methods to be employed, the tactics to be used in battle, will depend upon the character of our enemy, and for practical training it is of the greatest use to assume an enemy which, considering the political aspect of the world, would seem to be the most probable. In fact the political aspect of the world is the guide for the commander-in-chief. Battle tactics cannot be written, they must be practiced under battle conditions.

Such tactics will ever change with the change of conditions. To-day a particular nation may seem our most probable enemy; complications may arise that will change the political aspect and some other nation will loom up as our most probable enemy. But the objective of our battle training should never change. It should always be the most probable enemy of to-day. We have developed certain axioms from the game board, and battle tactics is the application of these axioms to the conditions under which the battle is to be fought. We can create or imagine innumerable conditions, and can present no end of problems, but the problem that concerns us first and most, is war with our most probable enemy. There is no creation, nor imagination, in this, it is a plain, practical, probable fact, and I believe the solution of this

problem can best be made by causing in all cases where our forces are maneuvering against each other, that one force represent, as nearly as possible, the tactical conditions of our most probable enemy. Our ships are not built to fight each other, nor are squadrons organized to operate against each other; and I make this point, that in handling one of our squadrons against another of our squadrons for battle drill purposes that it is altogether best to use tactical conditions that it is most probable we shall have to contend with in war. The tendency of some officers who have written upon naval tactics seems to be to lose sight of the absolute necessity for the simplest formations, with the fewest possible changes of formation; there seems to be a tendency to search for some mysterious method that will settle the entire question of tactics. This, I think, comes from a lack of practical experience at the game board, and in fleet, and the failure to appreciate the actual conditions of battle, and the requirements of the practice of modern gunnery. Battle tactics may be defined as taking that position where our shooting will be better than that of the enemy and maintaining that position with the least possible change of the rate of change of range. Every officer, I am sure, will agree that we must have the greatest volume of fire possible with the least possible change in the rate of change of range. These conditions *demand* the simplest possible formations with the fewest possible changes of formation, and the successful tactician is the one who can maintain such a position, and require the enemy to make the change of course, or formation. Furthermore, it must be acknowledged that we cannot get results from paper work; that we *must* have practice afloat, and that to have battle practice, we must have conditions as nearly as possible approaching those of battle. Why is it not practical and best to use those conditions which it is most probable we shall have—conditions of war with our most probable enemy. If we select a specific force, such as that of our most probable enemy, we create an objective for our battle practice, and eliminate generalities by confining our methods to this specific force. From a general consideration of the training of our personnel, it appears that our system up to flag rank is good and should give good results, but that we are greatly in need of a system of training our flag officers.

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SKELETON, OR PLOTTING, CHARTS.

A SUGGESTION RECENTLY LAID BEFORE THE HYDROGRAPHIC OFFICE.

By LIEUT.-COMMANDER RAYMOND STONE, U. S. Navy.

Graphical solutions of the problem of finding a ship's position at sea, by plotting and intersecting Sumner lines, lines of bearing, etc., being nowadays so general in our service, especially since the almost universal adoption of the Marcq St. Hilaire method, I am submitting a suggestion concerning what may be termed skeleton, or plotting, charts, which will, I believe, prove of great value and convenience to navigators, and of no great expense or trouble to the hydrographic office. For a plotting chart such as I have in mind there are three requisites:—

(a) It should be of sufficiently large scale to permit of accurate plotting and picking off.

(b) It should be sufficiently small in physical dimensions to permit of handy use on the restricted chart desks and in cramped chart rooms of modern fighting ships.

(c) It should be on paper sufficiently tough and durable to stand numerous erasures.

The following features are suggested, viz.:—

Projection.—Mercator.

Scale.—One inch equals 10′ of arc in longitude.

Dimensions.—Between inner neat lines, 30 inches in width (5° of longitude) and a sufficient height to contain 5° of latitude stretched in conformity with the Mercator projection. Even 3° of longitude, 18 inches width, will suffice.

Delineation, Hydrography and Topography.—None needed.

Measuring Scale.—One of the interior meridians and one of the interior parallels to be subdivided into minutes of arc. For con-

venience the marginal lines might also be subdivided, but this is not strictly necessary; though the inner scales might become obliterated by frequent erasure.

Range of Chart.—From 0° to 60° in latitude, a set of 12 charts in all. Our ships rarely get in higher latitude than 60.° The charts are good in either north or south latitude.

I do not claim exclusive originality in this suggestion; and I am aware that it may be said of such suggestion that on any ship of size the navigator or his midshipman assistant could easily construct such a chart in an hour or two, as needed; in fact I know that this has been done on occasion. But in these modern days of multiple and multifarious duties the navigator has little time except for sights and solutions, and his assistant is frequently so in name only, being primarily occupied with matters of gunnery training, fire-control, etc. And further, the accuracy of such improvised charts is open to question.

The general usefulness of such a plotting chart seems obvious; and its specific and particular handiness to the navigator who (at least in some of our ships) must, by rules of organization, spend a considerable portion of the precious forenoon in charge of the bridge, as the relief of the regular watch officer while he is away at drills and divisional duties, seems even more than obvious.

LATER.—Acting on this suggestion the Hydrographic Office has prepared and is furnishing to ships a fine set of charts called "Position Plotting Sheet." Since writing the foregoing article I am informed by the editor that charts of this sort are used in the British service and have long been on sale in Great Britain and her colonies.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

A SEA VIEW OF OUR REVOLUTION.

By EDGAR S. MACLAY, A. M.

I. IMPORTANCE OF OUR SEA OPERATIONS.

When we remember that all the general histories of the United States, recognized as standard, have been written by landmen, we can understand how military operations ashore during our Revolution have received their full measure of notice and how equally important occurrences afloat have been almost ignored. It may safely be declared that the cornerstone of American history is Bancroft's monumental work, with that of Hildreth supplementing it—the first favoring one great political party and the second the "opposition," but each giving scant attention to the important part our maritime forces played in securing the independence of the United States.

It seems to be on this foundation, so firmly laid by Bancroft and Hildreth, that succeeding American historians have builded and enlarged their superstructure; all giving full justice to operations on land and all failing, proportionately, to give due prominence to important occurrences at sea—as shown in the great works of John Bach McMaster and Woodrow Wilson. And even in that latest and greatest general history of the United States (by Elroy McKendree Avery in 16 royal octavo volumes, now in course of publication), where evident effort has been made to restore historical land and sea equilibrium, the balance is still far from normal.

It is well within the fact to state that all of our general histories of this country give at least ten times more space to military operations on land than to sea occurrences—from which the reader naturally would suppose that the former were ten times more extensive or important than the latter—and that, unquestionably, is the impression that has dominated the American public for more than a century and a quarter.

A careful summary of the *bona fide* battles (not mere skirmishes but actions in which men were killed or wounded) in our Revolution will show that 57 were fought on water as opposed to 48 on land; that in the 57 on water the Americans won 41, lost eight and had eight indecisive; while in the 48 battles on land we had 19 victories, 26 defeats and three indecisive. In this summary, as in all other compilations in this article, State cruisers and privateers are included in our sea forces. This is no more than just. These private-armed vessels were authorized by Continental Congress and commissioned by the States (colonies) from which they sailed. Many of them were commanded by officers in the navy or by men who afterward entered the regular service. They formed the "militia of the sea" and were quite as much entitled to official recognition as the many bands of riflemen, companies and even regiments that were enlisted under private auspices during the Revolution and who, at first, formed the bulk of our armies.

Probably it never will be known how many men served in our land forces during the Revolution. They were coming and going most of the time so that it is impossible to determine their exact number, but it is doubtful if Washington ever had under his command, at one time, more than 15,000 disciplined and well-equipped Americans. According to Bancroft * (Vol. V, p. 17): "Washington never had [before Boston] more than 14,500 men fit for duty." For the same reason it is impossible to arrive at the exact number of seamen who manned our militant craft in the struggle for independence, but we do know that from 1775 to 1782 we commissioned 856 Continental and private-armed vessels and, allowing the very moderate average of 50 men to each, we have a total of 42,800.

Of course, many of these men enlisted several times so that 42,800 by no means represents the force actually in service at one time, but, by taking a single year, we can gain a fairly accurate estimate of the number of our sea fighters. For instance, in 1776 we had 167 war craft (mounting 1946 cannon and swivels) in commission. Allowing 50 men to each, we have a formidable army of 8350 men handling nearly 2000 cannon and swivels—a park of artillery field-marshals in those days scarce dreamed of.

* All quotations from Bancroft in this article are from the centenary edition.

In 1777, when our sea forces were at their lowest ebb, we commissioned 107 war craft, mounting 1142 cannon and swivels and manned by no fewer than 5350 men. In 1780 we had in commission 241 war ships, mounting 3686 cannon and swivels and manned by no fewer than 12,000 splendidly drilled mariners, while in 1781 we commissioned 458 fighting craft, mounting 6899 guns and manned by more than 22,000 of the best sea warriors the world had then seen.

Striking an average from each of the seven years of this war, we find that we had in commission during that period, 232 war craft, mounting 3359 cannon and swivels and manned by 11,600 well-equipped, perfectly disciplined and thoroughly seasoned mariners. This was the magnificent body of men who formed the vanguard of American independence. It was through this cordon of veterans of the sea that the invading armies had to pass before setting foot on the shores where our forefathers were fighting for their liberty.

It is far from the writer's purpose to, in any degree, disparage or belittle the noble part played by our land forces in the Revolution—the only object here being to give proportionate credit to our sea fighters of the same period and the following comparisons should be regarded in that light.

Because of that daring and laudable exploit which resulted in the capture of Ticonderoga, with its garrison of fifty men, many American geographical points have been named in its honor. It is but natural to ask: how many similar geographical points have been named in honor of the Yankee privateer *Tyrannicide* which captured a British transport having on board 63 Hessian chasseurs or of the Continental cruiser *Alfred* which captured a transport with more than 100 troops aboard?—both equally daring and laudable exploits. Every American school boy has read of the capture of Stony Point with its garrison of 543 men, but how many know of the capture of 300 British soldiers with their colonel in two transports, after a severe engagement, by the little cruiser *Lee;* or of 200 Highlanders and 20 army officers of the 71st Regiment by our *Andrea Doria?*

We have all read of the bold seizure of Major Prescott by the patriots, but how many of us know of the capture of a colonel, four lieutenant-colonels and three majors of the English Army by the 18-gun privateer *Vengeance?* Major Prescott was cap-

tured by the American land forces, but one officer in the British service at that time had the distinction of being captured three times by our sea forces. He was Lieutenant Campbell, taken just off Boston when endeavoring to land. A few years later, when a major and on his way from New York to Savannah, he was again captured. Again being exchanged he was captured for the third time (then having the rank of lieutenant-colonel) by one of our war ships while on his way across the Atlantic to England.

Altogether, more than 1000 soldiers of armies England sent across the Atlantic to fight against our patriotic forefathers, were captured at sea by our seamen. In the 57 battles in which our sailors of the Revolution engaged, a total of 1010 Americans fell, killed or wounded; while they inflicted a loss of 1507 on the enemy. A magnificent monument and an even more magnificent oration perpetuates the fame of the 449 Americans who were killed or wounded at the Battle of Bunker Hill and who inflicted a loss of 1054 on the enemy. Where is the monument or oration that distinctively perpetuates the memory of those sea fighters who suffered far greater losses and inflicted far greater injury on the enemy than did the heroes of Bunker Hill?

But it was not the loss of her troops that "cut England to the quick" so much as the loss of her sailors. She could replace her soldiers so long as the stock of mercenaries held out, but she could not replace her sailors; and it was right here that our army of 11,600 sea warriors struck their most effective blows. We all know that nearly 1000 prisoners were taken at Trenton, that Gates made some 8000 prisoners at Saratoga and that the American and French arms secured some 7000 at Yorktown, but how many of us know that *fully 16,000 English sailors were made prisoners on the high seas during the Revolution by American war craft?*

II. American Preparedness at Sea.

Thus far in this article we have dealt in figures and statements which seamen might aptly term "gross tonnage" or "bulk." We will now investigate the quality of the "cargo" we have been handling. To foil the charge of wilfully antagonizing our land forces we will confine our quotations to the aforesaid histories written so conspicuously in favor of our shore operations by landmen.

That Americans are preeminently a maritime people was shown

in their extraordinary preparedness at sea and capacity for fighting on water—from the beginning to the end of the Revolution—as contrasted to their unpreparedness for active military operations on land. From the day hostilities broke out, our seamen were in complete readiness for battle and began that assault on England's commerce and transport service which so seriously interrupted her plans. Our ships and sailors were ready at the word. There were no months, weeks or even days wasted in "drilling raw recruits," there were no commissary or quartermaster departments to delay provisioning and equipping our armed craft, there were no long complaints from our commanders about the difficulty, ay, impossibility, of securing arms and the munitions of war.

There were a few instances where Yankee craft put to sea short-handed, poorly equipped and insufficiently supplied with provisions, but, by means of seizures on the high seas or by other methods devised by the ingenuity of their commanders, they managed to remedy these failings without appealing to Continental Congress. And it can be truly said that there were no epidemics or contagious diseases breaking out and incapacitating entire ship's companies: and with even greater truth, it may be stated that no seasickness, "homesickness" or any other kind of ailment resulted in large detachments of sailors returning to their homes after enlisting.

All these amateurish details had been attended to and mastered by our sea warriors long before the Revolution broke out so that, when the hour came, they set sail in staunch craft, sufficiently well armed, equipped and provisioned to render instant active service in the cause for which they were contending. The officers were experienced and accustomed to their commands; the crews were thoroughly disciplined and eager for the fray.

In striking contrast to our preparedness to fight at sea, we have the unorganized, undisciplined and generally confused condition prevailing among our land forces at the outbreak of the Revolution. Speaking of the army collected before Boston to drive the English out, Bancroft says (Vol. V. p. 154):

> The troops before Boston were a mixture of new recruits and transient militia whose frequent mutation called for constant renewal of elementary instruction. There was a dearth of bayonets, a want of at least 2000 muskets; the artillery was poor and was chiefly gathered from accidental sources. There was no store of powder.

On pages 15 and 17, Vol. V, Bancroft records:

> The camp contained a people in arms rather than an army. No one could tell precisely its numbers or the state of its stores. The soldiers had listed under different agreements and for periods indefinite but short. Each colony had its own rules of military government and its own system of supplies; and the men, chiefly freeholders and sons of freeholders, held themselves bound only by a specific covenant, of which they interpreted the conditions. . . . . Some of the soldiers demanded their pay on the basis of lunar months. . . . . The mothers, wives or sisters of the soldiers were constantly coming to the camp with supplies of clothing and household gifts. Boys and girls, too, flocked in with their parents from the country to visit their kindred, and gaze on the emblems and terrors of war. Eloquent chaplains kept alive the habit of prayer and preached the wonted sermons on the day of the Lord. The habit of inquisitiveness and self-direction stood in the way of military discipline: the men never learned implicit obedience and knew not how to set about it; between the privates and their officers there prevailed the kindly spirit and equality of life at home.

In February, 1776, Washington wrote to Congress declaring that his army consisted largely of "fleeting bands of undisciplined men, ill-clad and poorly armed."

And these land forces were almost as badly off in equipment as they were in organization and discipline, for Bancroft records that "except a little powder in a magazine near Williamsburg, it [Virginia] was destitute of warlike stores," while "not 500 pounds of powder was in the city of New York," and Massachusetts "had hardly ammunition enough for a parade day."

Speaking of the army before Boston, Bancroft says (Vol. IV, p. 541-542):

> As for artillery, it was found, on inquiry, that there were altogether no more than six 3-pounders and one 16-pounder in Cambridge, besides sixteen pieces in Watertown, of different sizes, some of them good for nothing. But even these were more than could be used. There was no ammunition but for the six 3-pounders, and very little for them. In the scarcity of powder the most anxious search was made throughout the colony [Massachusetts]; and after scouring the five principal counties, the whole amount that could be found was less than 68 barrels. The other colonies, to which the most urgent entreaties were addressed for a supply, were equally impoverished.

Another weakening feature found in our land forces and scarcely known among our sailors was that of desertion, not only while on the march, but in the face of the enemy. Speaking of Montgomery's invasion of Canada in November, 1775, Bancroft says (Vol. IV, p. 130): "Homesickness so prevailed [among the

troops] that he [Montgomery] was left with no more than 800 men to garrison his conquests and to go down against Quebec. Even most of the Green Mountain Boys deserted him"; and in reference to Montgomery's subsequent attack on Quebec, Bancroft records: "As the time for the assault drew near three captains in Arnold's battalion, whose terms of service were soon to expire, showed mutinous disaffection. . . . . A deserter to the garrison" revealed to the defenders of Quebec the time and plan of Montgomery's assault on that stronghold which largely contributed to the disastrous termination of the attack.

That our land forces were far behind their brethren on the sea in the arts of maintaining a sanitary condition among a body of men confined in a small space (or even in the open) was sadly demonstrated in the retreat of Montgomery's remnant of an army from Canada. Early in July, 1776, the army reached Crown Point and Bancroft says (Vol. V, p. 357):

> The scene of distress produced a momentary despair. Everything about them, their clothes, their blankets, the air, the very ground they trod on, was infected with pestilence. "I did not look into a tent or a hut," says Trumbull, "in which I did not find either a dead or dying man." Of about 5000 men housed under tents, or rudely built sheds or huts of brush, exposed to the damp air of night, full half were invalids; more than 30 new graves were made every day. In a little more than two months, the northern army lost by desertion and death more than 5000 men.

III. Colonial Dependence on the Sea.

In these days when transatlantic passenger and freight service has been reduced to a ferry schedule; when the cable, the telegraph and the wireless have rendered intercontinental transmission of news almost instantaneous; when modern methods of preserving meat and other edibles have made it possible for man to exist in almost any part of the world, it is difficult for us to appreciate the dependence of the colonists on commerce. Homespuns and cured skins kept out the cold but they were not the clothing long to be tolerated by a highly intelligent people, so, with the almost total absence of manufacturers, the importation of cloth and other commodities of a civilized race became a necessity.

Not the least of household necessities in those days was salt (then imported exclusively from England), the price of which at that period reached as high as $28 a barrel. There were scores of other articles of daily use which could not be obtained in the

colonies except by importation, but this single illustration of salt (then the general means of preserving meat) fairly represents their importance.

As the first overt acts of resistance to motherland developed into open rebellion, we find that the colonists became more and more dependent on sea communications. "Some foreign commerce," wrote Bancroft (Vol. V, p. 142) "was required for the continuance of the war; the Americans had no magazines to replenish their little store of powder, no arsenals to furnish arms; their best dependence was on prizes, made under the pine-tree flag by the brave Manly and others who cruised in armed ships with commissions from Washington; even flints were obtained only from captured store-ships." The very tents that gave partial shelter to our soldiers entrenched before Boston in the winter of 1775-'76 were made from sails collected in American seaports.

On November 29, 1775, the little cruister *Lee* of Massachusetts entered Cape Ann Roads with her prize the *Nancy*, laden with 2000 muskets and bayonets, 8000 fuses, 31 tons of musket shot, 3000 shot for 12-pounder cannon, several barrels of powder and other munitions of war. In the following spring the *Franklin* brought in the store-ship *Hope* with her cargo of 1500 barrels of powder, a large quantity of entrenching tools and many gun-carriages—all of which were forwarded to our forces before Boston.

One of the first important captures of military supplies in this war was that made by a party of daring sailors who sailed from Philadelphia, overpowered the garrison at Hamilton, Bermuda, and returned with all the powder, arms and other military supplies stored in that place; and early in the spring of 1776 Captain Esek Hopkins' squadron captured New Providence in the Bahamas and reached New England with Governor Brown as a prisoner (afterward exchanged for "Lord" Stirling) besides 80 cannon, 15 barrels of powder and a quantity of other military stores.

As might be expected, these captures at sea, acceptable and important as they were in the emergency, could not be depended upon to adequately supply several armies in the course of a seven years' war. For this reason Congress sent Benjamin Franklin, Silas Deane and Arthur Lee to France and Spain to negotiate for regular supplies, to be transported to America; first from Nantes and Bilboa, until the British Ambassadors to France and Spain

compelled a discontinuance of this violation of "alleged" neutrality, and then from Dutch and other ports in the West Indies.

But even in this important move, as can be seen plainly, our sea forces were indispensable, not only in providing transport for our agents to and from Europe or to friendly ports in the West Indies from which they took passage in neutral vessels to France or Spain (and also in carrying cargoes of rice, tobacco, furs and other products on the safe delivery of which payment for these military supplies was based), but in transporting these munitions of war back to America. "During the summer of 1775," records Bancroft (Vol. V, p. 49), "ships were boarded off Savannah River and St. Augustine and more than 20,000 pounds of gunpowder were acquired. The export of rice was allowed on no other terms than that it would be exchanged for arms and ammunition, which were obtained from Hispaniola and from the French and Dutch islands" in the West Indies.

How sensible the British ministry was of the importance of cutting off this foreign supply of military stores to American land forces is fully shown by Bancroft when he records (Vol. IV, p. 483):

> While providing for reinforcements to its army, England enjoined the strictest watchfulness on its consuls and agents in every part of Europe, to intercept all munitions of war intended for the colonies. To check the formation of magazines on the Dutch island of St. Eustatius [in the West Indies], which was the resort of New England mariners, the British envoy, with dictatorial menaces, required the Staates-general of Holland to forbid their subjects from so much as transporting military stores to the West Indies beyond the absolute want of their own colonies. Of the French government, preventive measures were requested in the most courteous words.

Reinforcing these diplomatic strokes with material support, England, from 1776 to 1779, when her relations with France were strained to the point of rupture, massed the bulk of her great naval power off the coasts of the rebelling colonies and in the West Indies in an effort to cut off the supply of arms and munitions of war which was being carried into American ports. It was through these meshes of inimical diplomacy and hostile war craft that our brave seamen had to force their way (and with extraordinary success, too) in their efforts to supply our land forces with the absolutely necessary means for continuing an armed existence in the field.

IV. Americans a Maritime People.

Naturally, we look for some explanation of the extraordinary preparedness for immediate service on the part of our sea forces (not only at the outbreak of the Revolution, but all through the seven years of that struggle) and the too evident unpreparedness, and even inaptitude for military service, of our land forces during the same period.

This explanation is had in the fact that the American colonist came almost exclusively from the greatest seafaring races the world had then seen. At the time Columbus discovered America, the Spaniards and Portuguese were the leading navigators of the world; many of their people settling in the North American colonies, the Spanish mostly in Florida, Georgia and the present Gulf States and the Portuguese in what is now Maine. The French and Dutch also were bold and skilful seamen, the former settling in Canada, Louisiana and along the Great Lakes, while the Dutch located on the shores of the Hudson and Connecticut Rivers. Then we have the Scandinavians and English, each being identified with some of the greatest maritime exploits in history.

In these days of enlightenment it is difficult for us to appreciate the old-time "dread of that mysterious" ocean. It took Columbus many years to "drum it into the heads" of the wisest statesmen of his day that it was possible for the earth to be round and that "people in Cathay could stand upside-down without falling off the earth." The belief was then general that the earth was flat and if one sailed too far, the craft and all aboard would tumble over some gigantic cascade and be swept into eternity.

This real fear of the sea is well described in Avery's history (Vol. I, pp. 67-68) when he says:

> The story goes that eight Arabs built a boat, provisioned it for a voyage of several months and fearlessly sailed from Lisbon directly out into the Sea of Darkness. This dreaded watery waste with its fabled monsters was a "vast and boundless ocean on which ships dare not venture out of sight of land, for, even if they knew the direction of the winds, they would not know whither those winds would carry them, and, as there is no inhabited country beyond, they would run great risk of being lost in mist and vapor." Here was the home of the monster with the ox's head, with knobbed scales and with hatred for all Christians. Here was Demogorgon with hurricanes and destruction flowing from his mouth. Here Sinbad's gigantic roc seized its white-winged prey and soared aloft with ship and crew into the upper air. Here Satan's black and horrid hand reached

forth from ocean depths to seize and to destroy any one who ventured to intrude.

It required men and women of the highest courage to overcome these superstitions pertaining to the sea, and it required even greater courage to face the real perils of the sea; and the result was that only the bravest of these men and women belonging to preeminently maritime races, crossed the Atlantic and settled in the wilds of America.

Having successfully made the venture the colonists soon acquired a familiarity and even fondness for the sea, and all that pertained to it, which afterward assisted them so powerfully when fighting for their independence. It was in "cargoes that came across the sea" that the colonist found his necessary supplies and it was to the arrival of these ships that they eagerly looked for news from homelands. It was on the water that they depended for a considerable portion of their sustenance and, owing to the difficulty of cutting roads through boundless forests and bridging innumerable rivers, chasms and swamps, intercolonial communication was mainly carried on by water craft. Nearly all the first settlements were established on rivers or around irregularly formed bays so that communication between some of the houses in the same village was more conveniently had by boats.

Under such fostering conditions it is not strange that we find the North American colonists (blending the several distinctively nautical strains in their blood into a new, composite people) developed into the most daring, skilful and enterprising maritime race the world has ever seen. Edmund Burke recognized the amazing nautical capacity of the Americans when he said, in a speech in Parliament at the time of our Revolution:

> As to the wealth which the colonies have drawn from the sea by their fisheries, you had all that matter fully opened at your bar. And pray, sir, what in the world is equal to it? Pass by the other parts and look at the manner in which the people of New England have of late carried on the whale fishery. Whilst we follow them among the tumbling mountains of ice and behold them penetrating into the deepest frozen recesses of Hudson's Bay and Davis's Straits, whilst we are looking for them beneath the arctic circle, we hear that they have pierced into the opposite region of polar cold, that they are at the antipodes and engaged under the frozen serpent of the south. Falkland Island, which seemed too remote and romantic an object for the grasp of national ambition, is but a stage and resting-place in the progress of their victorious industry. Nor is the equinoctial heat more discouraging to them than the accumulated winter

of both poles. We know that, whilst some of them draw the line and strike the harpoon on the coast of Africa, others run the longitude and pursue their gigantic game along the coast of Brazil. No sea but what is vexed by their fisheries. No climate that is not witness to their toils. Neither the perseverance of Holland, nor the activity of France, nor the dextrous and firm sagacity of English enterprise ever carried this most perilous mode of hard industry to the extent to which it has been pushed by this recent people; a people who are still, as it were, but in the gristle and not yet hardened into the bone of manhood.

Nearly half a century later Daniel Webster depicted the pre-eminently maritime characteristics of the American people in a speech before Congress in these remarkable and prophetic words:

If war you must have [War of 1812], go to the ocean. If you are seriously contending for maritime rights, go to the theatre where alone these rights can be defended. Thither every indication of your fortunes points you. Even our party divisions, acrimonious as they are, cease at the water's edge. They are lost in the attachment to the national character on that element, where that character is made respectable. In protecting naval interests by naval means you will arm yourselves with the whole power of national sentiment, and may command the whole abundance of national resources. In time you may enable yourselves to redress injuries in the place where they may be offered and, if need be, to accompany your own flag throughout the world with the protection of your own cannon.

V. England's Valuation of our Sea Forces.

Possibly the most remarkable feature of the extraordinary services rendered by our sea forces during the Revolution was the superb audacity and astounding success with which they carried the war "into the enemy's country." American historians, in their general histories of the United States, have given from ten to fifty times more notice to the operations of our armies than they did to our war craft, but a careful review of "petitions direct to the throne," memorials to the ministry, speeches in Parliament and contemporaneous English periodicals and publications shows conclusively that our sea forces occasioned, perhaps, "from ten to fifty" times more consternation and acute anxiety in the "tight little island" than our land forces did.

It can be conservatively stated that when the British ministry, backed by an obstinate king, forced the colonies into rebellion, they little thought that they were inviting danger to their very doors. Their idea of "crushing" the refractory Americans into obedience was a somewhat expensive transportation of German mercenaries across the Atlantic where the "difficulty" would be

speedily adjusted in the "wilds of the New World," far removed from any possibility of interfering with British interests in other quarters of the globe. The cost of this transportation, the ministers calculated, would be more than balanced by English merchants securing more of the carrying trade of the world. Long before hostilities broke out, the British ship owner had felt and loudly complained of the competition of their transatlantic cousins and, in spite of the Navigation Acts (which Parliament devised for the expressed purpose of "smothering" this competition) the colonial skipper was getting more of this trade than the British ship masters deemed fair.

It was with some degree of complacency, therefore, that English commercial circles looked forward to the war. But when they found that their craft, cargoes and crews were being captured, not only in distant seas, but in the very chops of the English Channel, in the waters of the Irish Sea and in the firths of Scotland, they were touched in their most sensitive spot—their pockets. Then arose a vehement protest against "this American war that is wrecking our fortunes" and the money class—then all-powerful in England—was enlisted in a campaign against its continuance; not because the war was being carried on in a brutal manner against a brave and spirited people struggling for their birthright, but because that war was resulting so disastrously to the English mercantile exchequer.

When England countenanced the destruction of Falmouth (now Portland, Me.) and Norfolk, Va., by ruthless burning, when she condoned the predatory expeditions which seized silver plate and other valuables of the colonists, when she failed to reprove her troops for destroying the homes of private citizens, she little thought that she was inviting a similar tribulation to her own shores. Yet the daring of Connyngham, Wickes, Jones and others caused her to realize that those "rebels" had arms long enough to reach across the Atlantic and deliver effective blows at her very doors. When England found that shipping in her own harbors was burned by the "impudent Yankee," that it was not safe for peers of the realm to dwell in their coast-wise country seats, when wealthy yeomen buried their family plate lest it be seized by those "piratical sailors headed by one Jones," she began to think far more seriously about the war.

Referring to the effect produced in England by the daring cruise of Connyngham in British waters in 1777, Silas Deane

wrote to the Marine Committee (Sparks' Diplomatic Correspondence):

It effectually alarmed England, prevented the great fair at Chester, occasioned insurance to rise, and even deterred the English merchant from shipping goods in English vessels at any rate of insurance. So that in a few weeks forty French ships were loaded in London on freight—an instance never before known.

British merchants even asked for the escort of war ships in the few hours' run from England to Ireland. The *Gentleman's Magazine* (an English publication), in its issue of July, 1779, records:

In no former war, not even in any of the wars with France and Spain, were the linen ships from Ireland to England escorted by war ships.

Fully appreciating the important part our sea forces were playing in the struggle, Dr. Franklin, writing from Paris, May 26, 1777, to the Committee on Foreign Affairs (see Sparks' Diplomatic Correspondence), said:

I have not the least doubt but that two or three of the Continental frigates sent into the German ocean, with some less swift-sailing craft, might intercept and seize a great part of the Baltic and Northern trade. One frigate would be sufficient to destroy the whole of the Greenland whale fisheries and take the Hudson Bay ships returning.

More forcible still is the testimony of the British themselves as to the consternation wrought in England by our sea forces. In its issue of August, 1812, the *London Statesman* says in reference to our Revolution:

Every one must recollect what they did in the latter part of the American war. The books at Lloyd's will recount it and the rate of assurances at that time will clearly prove what their diminutive strength was able to effect in the face of our navy; and that when nearly one hundred pennants were flying on their coast. Were we able to prevent their going in and out, or stop them from taking our trade and our store ships, even in sight of our own garrisons? Besides, were they not in the English and Irish channels picking up our homeward bound trade, sending their prizes into French and Spanish ports, to the great terror and annoyance of our merchants and ship owners?

These are facts which can be traced to a period when America was in her infancy, without ships, without money, and at a time when our navy was not much less in strength than at present. The Americans will be found to be a different sort of enemy by sea than the French. They possess nautical knowledge, with equal enterprise to ourselves. They will be found attempting deeds which a Frenchman would never think of, and they will have all the ports of our enemy open, in which they can make good their retreat with their booty. In a predatory war on commerce

Great Britain would have more to lose than to gain, because the Americans would retire within themselves, having everything they want for supplies, and what foreign commerce they might have would be carried on in fast-sailing, armed vessels which, as heretofore, would be able to fight or run, as best suited their force or inclination.

We get some idea of the amazing activity of our sea forces in British home waters from the *Edinburg Advertiser* in its issue of April 13, 1779, which contains notices of four actions between American and Scotch craft fought off the Irish coast within two weeks; and on the very day the last of these actions was fought (off the harbor of Cork March 28, 1779), the Yankee 20-gun privateer *General Arnold*, commanded by Moses Brown (afterward a captain in our navy), had a severe action with the Liverpool letter of marque *Gregson* of equal force off St. Michael's of the Western Isles—the enemy sustaining a loss of 18 killed and a proportionate number wounded. And fewer than seven weeks after this the *General Arnold* captured the English privateer *Nanny*, after one of the most spirited single-ship actions of the war, off Cape Finisterre.

From the *London Remembrancer* of 1777 we get another illustration of the astounding audacity of our privateersmen:

An American privateer of twelve guns came into one of the ports of the Jersey Islands, in the English Channel, yesterday morning, tacked about on the firing of the guns from the castle and, just off the island, took a large brig bound for this port, which they have since carried into Cherbourg. The American privateer had the impudence to send her boat in the dusk of the evening to a little island off here called Jetto, and unluckily carried off the lieutenant of Northley's Independent Company with the garrison adjutant, who were shooting rabbits for their diversion. The brig they took is valued at thirty-five thousand dollars.

Not only in the citadel of England's maritime strength did our gallant sailors carry the war for independence, but they waged it with equal effect against her distant dependencies as is most conclusively shown in the following extracts (see *London Remembrancer* of 1777) from letters written by Englishmen. One letter written from Jamaica in 1777 records: "Within one week upward of fourteen sail of our ships have been carried into Martinique by American privateers," while another letter from Grenada, written about the same time, declares:

Everything continues exceedingly dear and we are happy if we can get anything for money, by reason of the quantity of vessels taken by the Americans. A fleet of vessels came from Ireland a few days ago. From

sixty vessels that departed from Ireland not above twenty-five arrived in this and neighboring islands, the others, it is thought, being all taken by American privateers. God knows, if this American war continues much longer we shall all die with hunger. There was a ship from Africa with four hundred and fifty negroes, some thousand weight of gold dust and a great many elephant teeth—the whole cargo being computed to be worth twenty thousand pounds—also taken by an American privateer, a brig mounting fourteen cannon.

These were the blows that aroused England to the seriousness of her conflict with the refractory Americans, these were the blows that "struck home." It was to stem the torrent of popular clamor and protest against "this annihilation of our commerce" that Parliament made a special investigation, not of the ravages by disease or loss by capture of British troops in America, but of the ravages being made in English commerce.

As a result of this investigation Alderman Woodbridge, on February 6, 1778, testified at the bar of the House of Lords, that "the number of ships lost by capture or destroyed by American privateers since the beginning of the war was 733 whose cargoes were computed to be worth over ten million dollars. That insurance before the war was two per cent to America and two and a half per cent to North Carolina, Jamaica, etc., but now that insurance had more than doubled, even with a strong escort, and without an escort, fifteen per cent." On his return from a cruise in the English Channel in 1776, Captain Bucklon, of Rhode Island, reported that the rate of insurance in England had risen to 30 per cent on vessels under convoy and for those sailing without escort, 50 per cent.

Another witness examined in the House of Lords in this "investigation" was William Creighton who said that "the losses suffered by British merchants in consequence of captures made by American privateers up to October, 1777, could not be short of eleven million dollars."

VI. Loyalty of our Seamen.

Lastly, but far from least, the loyalty of our seamen of the Revolution exerts a strong claim on the grateful record of the general histories of the United States. Not only as individuals, but collectively our sea fighters maintained a faith in the cause of freedom that forms a striking contrast to some conspicuous examples of treachery on the part of high army officers (such as

Charles Lee and Benedict Arnold) and to the wholesale desertions of our troops during the encampment at Valley Forge and other winter quarters—to say nothing of the companies and even regiments that were openly enlisted under the king's banner among the colonists.

There is no instance authoritatively recorded of any American sea officer deliberately betraying his trust and no instance of any considerable body of our sailors—certainly nothing approaching a "company" or "regiment"—deserting their colors in the face of the enemy. There were no "winter quarters" for our sailors in which to shelter themselves from the severe cold and in which to recuperate for the "summer campaigns," for records show that there were almost as many battles fought at sea in the winter months by our maritime forces during the seven years of the war as in any other one quarter of the year.

This remarkable loyalty is the more gratifying when we remember the special efforts made by the English to induce our seamen to serve under the royal standard. We have it in the words of Bancroft himself (Vol. V, p. 539):

> Every effort was made [by England] to gain recruits for the army and navy. Threats and promises were used to induce captive American sailors to enlist in the British service. "Hang me, if you will, to the yard-arm of your ship, but do not ask me to become a traitor to my country," was the answer of Nathan Coffin; and it expressed the spirit of them all.

In startling contrast to this we have Bancroft's statement that Delancy in New York enlisted 600 Americans and Cortland Skinner, of New Jersey, 500 to serve against their countrymen while the "Loyalists boasted that as many soldiers from the States were taken into the pay of the crown as the Continental Congress; and the boast, though grossly exaggerated, had some plausible foundation" (Bancroft, Vol. V, p. 544).

Extraordinary efforts were made by British authorities to induce American seamen, confined in the Wallabout prison ships, to serve the king and one of the objects the notorious David Sproats had in treating these prisoners with such brutality was to force them to escape from their "living death" by consenting to fight against their native land. It has been estimated that from 10,000 to 11,000 men perished in these "pest holes." David and Samuel Porter, besides many other high officers in the Continental and privateer service of the Revolution, were confined here; David

Porter (father of the hero of the frigate *Essex* in 1814) made his escape by concealing himself in a water cask that was being taken ashore to be filled, but his brother Samuel succumbed to the horrors of the place. From a letter written by Washington to Congress, dated February 18, 1782, we know that most of these martyrs were American sailors for Washington declared: "Few or none of these prisoners belonged to the regular cruisers of the colonies, most of them being captured privateersmen." Be it ever remembered to the honor of these seamen that most of them preferred having their bones bleached on the banks of the Wale Bogt in preference to serving against their country.

It may be said that there was a mutiny in the Continental frigate *Alliance* in 1779 and in our privateer *Jason* in the same year. The trouble in the first, however, was occasioned solely by British and French sailors—not by Americans—under the command of the eccentric Captain Pierre Landais, a Frenchman. The "mutiny," although planned, never reached the "breaking out" point. In the case of the *Jason* (then commanded by Captain John Manly, U. S. N.) the mutiny was suppressed in a manner that showed how discipline was maintained by our sea officers.

The affair is interestingly described in the diary of one Joshua Davis, a Boston hair-dresser's apprentice, who, catching the "privateering fever" enlisted in the *Jason*. After describing how this ship lost her masts in a squall off the southern coast of Maine, Davis says: "We got up jury masts and ran in between the Isle of Shoals and Portsmouth, where our captain was determined to take our masts in. In a few days Captain Manly went on shore to see to getting the masts on board. While he was gone Patrick Cruckshanks, our boatswain, Michael Wall, boatswain's mate, and John Graves, captain of the forecastle, went forward and sat down on the stump of the bowsprit and said they would not step the masts in such a wild roadstead to endanger their lives, but if the ship was taken into the harbor they would do it with pleasure. When Captain Manly came on board he asked Mr. Thayer why the people were not at work and was told that they wished to get into the harbor first. The captain answered, 'I'll harbor them,'" and stepped up to the sentry at the cabin door, took his cutlass out of his hand and ran forward and said:

"Boatswain, why do you not go to work?"

He [the boatswain] began to tell him the impropriety of getting the masts in where the ship then was, when Captain Manly struck him with

the cutlass on the cheek with such force that his teeth were to be seen from the upper part of his jaw to the lower part of his chin. He next spoke to John Graves and interrogated, and was answered in a similar manner, when the captain struck him with the cutlass on the head, which cut him so badly that he was obliged to be sent to the hospital with the boatswain.

The captain then called the others to come down and go to work. Michael Wall came down to him. The captain made a stroke at him, which missed and, while the captain was lifting up the cutlass to strike him again, Wall gave him a push against the stump of the foremast and ran aft. The captain made after him. Wall ran to the main hatchway and jumped down between the decks and hurt himself very much. The captain then, with severe threats, ordered the people to go to work. They went to work and stepped the masts, got the topmasts on end, lower yards athwart, the topsail yards on the caps, topgallant masts on end, sails bent, running rigging rove, boats on booms, etc., and all done in thirty-six hours.

VII. Summary.

Effort has been made in this article to show that campaigns at sea, during the American Revolution, were of a most important character; that being prepared for active service from the very start, our sea forces conducted their operations with a vigor and persistency to the close of that struggle that weighed heavily in the outcome; that the rebelling colonists were dependent on their sea forces for military supplies and other necessities in order to continue their fight on land; that Americans being a preeminently maritime race, were enabled to wage a most effective war against the common foe on the ocean; that England's most vulnerable point was her commerce, home interests and colonial dependencies which were assailed with astonishing daring and success by our seamen; and, finally, that there was a conspicuous absence of treachery or insubordination, individually or collectively, on the part of our mariners—in startling contrast to notorious examples of betrayal and disloyalty on the part of some army officers and large bodies of troops.

If these claims have, in any degree, been established in this article, then it certainly must be conceded that our sea forces in the American Revolution are entitled to far more than one-tenth (and, in the case of Bancroft's work, one-fiftieth) of the space allotted in the general histories of the United States to the military operations on land and sea during our struggle for independence.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

EARLY NAVAL VOYAGES TO THE ORIENT.

By CHARLES OSCAR PAULLIN.

XI.

THE VOYAGES TO JAPAN OF COMMODORE BIDDLE AND COMMANDER GLYNN: 1846, 1849.[1]

A half century after the Europeans began to navigate the Indian Ocean about the year 1500, the Portuguese and Spanish opened up a considerable trade with Japan. They were soon followed by the Dutch and English, who by the first part of the seventeenth century had almost monopolized the commerce between Japan and the Occident. In the meantime Roman Catholic missionaries had entered the land of the Mikado and were pursuing their calling with their usual zeal and bigotry. Finally, after welcoming the aggressive Westerners for upwards of a century, Japan entered upon a policy of non-intercourse with them, largely as a result of the strife engendered by the missionaries. In 1621 she forbade her citizens to visit foreign countries, and three years later she banished from her domain all Westerners, with the exception of the English and the Dutch. Twenty years later she limited her Western trade to the Dutch, and permitted them to visit only the island of Deshima, near Nagasaki. Here the Dutch erected a factory and established a small settlement, which was presided over by a general agent or superintendent. The natives were forbidden to visit the island, and the foreigners were not allowed to cross the small bridge which connected it with

[1] See East India Squadron Letters, 1845-1847, 37, 60-62; 1848-1850, 124-129, 194-263; Sen. Doc., No. 59, 32 Cong., 1 sess.; Nitobe, I. O. The Intercourse between the United States and Japan, 7-37; Chinese Repository, VI, 209-229, 353-380; XV, 172-180; XVIII, 315-332; Logs of the *Columbus*, *Vincennes* and *Preble*, U. S. Navy Department Archives; Proceedings of the United States Naval Institute (Annapolis), XXXI, 555-563; The Independent (New York), LIX, 407-501, 1043-1044; and Nordhoff, Charles, Nine Years a Sailor, 194-208.

Nagasaki. At first the Dutch were granted permission to send eight ships annually to their factory, but in time this number was reduced to two, and finally to one.[2]

During the Napoleonic wars, the Dutch, in order to avoid exposing their own vessels to capture by British cruisers, employed neutral ships to make the annual voyages to Deshima. It was owing to this practice that some of our merchantmen were afforded an opportunity to visit Japan—the first American ships to enter the waters of the Mikado. During the years 1797-1809, the Dutch hired no less than eight American vessels to make voyages from Batavia to Deshima: the *Eliza*, of Boston, Captain W. R. Stewart; *Franklin*, of Boston, Captain J. Devereux; *Massachusetts*, of Boston, Captain W. V. Hutchings; *Margaret*, of Salem, Captain Samuel Derby; *Samuel Smith*, Captain G. Stiles; *Rebecca*, Captain J. Deal; *America*, Captain Henry Lelar; and *Mount Vernon*, Captain J. Davidson. In Japanese waters these ships sailed under the Dutch flag, as otherwise they would not have been permitted to conduct the Dutch trade. The first account of Japan from the pen of an American was written by Mr. George Cleveland, the captain's clerk of the *Margaret*. The first two voyages were made by the *Eliza* in 1797 and 1798.

The captain of the *Eliza*, W. R. Stewart, appears to have been a shrewd Yankee, with a sharp eye for the main chance, for after completing his contract with the Dutch, he in 1803 sailed boldly into Nagasaki, under the American flag, with a cargo purchased in Bengal and Canton. He asked the Japanese permission to trade and to obtain some water and oil. The first request was positively refused, but the second was granted; and, after his wants had been supplied, he was ordered to depart. Four years later another American vessel, the *Eclipse*, visited Nagasaki, under circumstances that aroused the suspicion that she came to trade, rather than to obtain refreshments, professedly her object. She too was denied the rights of commerce, and on being furnished with provisions was permitted to continue her voyage. During the thirty years immediately succeeding the visit of the *Eclipse*, our merchantmen seem to have respected the desire of the Japanese to be left alone.[3]

[2] Nitobe, I. O., The Intercourse between the United States and Japan, 7-25; Adams, F. O., The History of Japan, I, 69.

[3] Doeff, H., Herinneringen uit Japan, 61-62, 153-157; Chinese Repository, X, 162.

The first American whale ship to enter Japanese waters made its appearance off the coast of Japan in 1820. In the following year some six or seven of these venturesome craft cruised there, and in 1822 more than thirty. It is highly probably that the early whalers sought refreshments on shore or anchored in some sheltered port to escape heavy weather.[4]

In 1837 the American firm of Olyphant and Company, of Canton, made an attempt to induce the Japanese to relax their exclusive commercial policy. It decided to transport to Japan some ship-wrecked subjects of the Mikado who had been brought to Macao, and to avail itself of the opportunity thus afforded for producing a favorable impression upon the Japanese government. The expedition was placed in charge of Mr. Charles W. King, an American merchant, and the American ship *Morrison*, Captain David Ingersoll, was chosen to make the voyage. For purposes of trade, a small assortment of cloth, adapted to the Japanese taste, was put on board, and several presents illustrative of the American civilization were added. As the object of the voyage was a peaceful one, the guns of the *Morrison* were removed. The expedition first proceeded to Yedo Bay, where it was fired on by the batteries on shore, and was not permitted to communicate with the government at Yedo. Thus foiled, it sailed southward to the bay of Kagoshima, and there it met with a similar reception. Forced to abandon its mission, it returned to China with the shipwrecked sailors, who on witnessing the hostile temper of their countrymen did not care to land.[5]

In 1846 a voyage similar to that of the *Morrison* was made by Captain Mercator Cooper, of the whaler *Manhattan*, of Sag Harbor, Long Island. While on a cruise to the whaling regions of the North Pacific, Cooper landed at St. Peter's Island, a few degrees southeast of Japan, and found there eleven shipwrecked Japanese sailors. He offered to convey them to their native land, and they gladly consented to go. On his way thither he rescued eleven more Japanese from a floating wreck. Arriving on the coast of Japan, he sent messengers to inform the Emperor of the object of his visit and of his desire to enter the harbor of Yedo. The Emperor gave his permission to visit the capital, and

[4] Davis, J. F. China during the War and since the Peace, II, 281; King, C. W., and Lay, G. T., The Claims of Japan and Malaysia upon Christendom, I, 75.

[5] Chinese Repository, VI, 209-229, 353-380.

on his arrival there treated him with much civility, supplying him with wood, water and provisions, and making him a present of some Japanese crockery, some lacquered ware and a specimen of the Emperor's writing. Cooper and his crew were forbidden to leave their ship and were commanded never to come again to Japan. He held several conversations with the governor of Yedo and other officials of rank, and after a stay of four days, having landed the shipwrecked sailors, left the bay.[6]

The first voyages of our merchantmen to Japan preceded by several years the first voyage of our national vessels. The earliest connection between the navy and Japan, if we may accept the authority of De Bow's Review, may be seen from the following item extracted from this journal for December, 1852: "This [expedition to Japan] has been long in contemplation by our government. Com. Porter, as far back as 1815, addressed a letter to Mr. Monroe [Secretary of State] on the subject, and it was then intended to send out Com. Porter with a frigate and two sloops of war, but the plan was defeated." Unfortunately this quotation, so far as it refers to Porter, stands unverified, and there is much doubt whether that officer ever proposed such an expedition.[7]

The first official action of the United States respecting Japan was taken in 1832 when Mr. Edmund Roberts, who had been ordered by the State Department to negotiate treaties with the rulers of Cochin China, Siam and Muscat, was authorized to institute a separate mission to Japan, provided he found the "prospect favorable." Should the mission be instituted, he was to take passage in a coasting vessel, under convoy of the sloop *Peacock*, since, to make the voyage in a ship of war would subject him to the indignity of having his vessel disarmed, in accordance with Japanese custom. For some reason, he decided not to make the proposed visit.

In 1835, when about to leave Washington on his second embassy to the Orient, Roberts was directed to go to Japan and attempt to open negotiations for a treaty with the Emperor of that country. The entering of some other port than Nagasaki, the Japanese permitting, was recommended, as the Dutch had an establishment there and they might feel themselves interested in thwarting him. In case he obtained a treaty, permission was

[6] Chinese Repository, XV, 172-179.
[7] De Bow's Review (New Orleans), XIII (1852), 560.

granted him to give the Japanese presents to the value of ten thousand dollars. He was furnished with a letter from President Jackson addressed to the Emperor and with numerous gifts, including a gold watch with a heavy gold chain eight feet long, a sabre, rifle and shot-gun, a pair of pistols, an assortment of broadcloth, some cut glass, a music box, some maps, a set of American coins, prints of American naval victories, and ten Merino sheep of the finest wool. On the death of Roberts in 1836, soon after reaching Macao, the Japanese mission was abandoned.[8]

The American missionaries and merchants in China early recognized that Japan offered a promising field for their activities, and were greatly interested in the measures proposed for the opening of that country to the outside world. They, in all probability, brought to bear their views on Commissioner Caleb Cushing during his six months' stay in China. However that may be, it was inevitable that so sagacious a diplomat as Cushing should, on making a treaty with China, conceive the idea that Japan might be induced to follow the example of her neighboring empire. He communicated his views on this subject to President Polk, who, although believing that the probability of effecting a commercial arrangement with Japan was small, authorized John C. Calhoun, the Secretary of State, to transmit to Cushing full powers to treat with the Japanese government. Cushing left China before he received Calhoun's letter, and the duty of undertaking the mission developed upon Alexander H. Everett, his successor as commissioner to China. Owing to sickness, Everett transferred his powers to Commodore James Biddle, who, however, was otherwise authorized to visit Japan, as may be seen from the following extract taken from his sailing orders dated May 22, 1845:

> You will hold the squadron at the disposal of the Commissioner, for the purpose of conveying him to any part of the coast of China or Japan, which he may have occasion to visit in the execution of his instructions. .... In an especial manner you will take the utmost care to ascertain if the ports of Japan are accessible. Should the Commissioner incline to make the effort of gaining access there, you will hold your squadron at his disposition for that purpose; and should he decline to do so, you may yourself, if you see fit, persevere in the design, yet not in such a manner as to excite a hostile feeling or distrust of the Government of the United States.[9]

[8] Foster, J. W., American Diplomacy in the Orient, 140-141; Sen. Doc., No. 59, 32 Cong., 1 sess., p. 63.

[9] Confidential Letters, U. S. Navy Department Archives, I, 126.

Biddle was one of the oldest and most distinguished officers of the navy, his name being seventh on the navy list of 1845. He was a nephew of Captain Nicholas Biddle, who lost his life during the Revolutionary War by the blowing up of his ship, the frigate *Randolph*, during an engagement with the British vessel *Yarmouth*. Young James entered the navy in 1800. In the war with Tripoli he served as a midshipman on board the *Philadelphia* and was imprisoned at Tripoli on the capture of that vessel. In the War of 1812 he was a lieutenant on the *Wasp* when she captured the *Frolic*, and the commander of the *Hornet* when that vessel took the *Penguin*, receiving for the latter victory a gold medal from Congress. After the War of 1812 he took possession of the country bordering on the Columbia River in behalf of the United States, and he served as one of the representatives of his government in negotiating its first treaty with Turkey.

Biddle's little squadron consisted of the ship of the line *Columbus*, the only vessel of that class to visit the Far East, and the sloop of war *Vincennes*, Captain Hiram Paulding, now making her fourth cruise to the Orient. On this voyage the *Columbus* sailed sixty-nine thousand miles, establishing a record for a ship of her class. On her return home she was laid up in ordinary at the Norfolk navy yard, where she remained until the outbreak of the Civil War, when she was scuttled and sunk to prevent her from falling into the hands of the Confederates.

Biddle's duties in China, which have been described in the previous chapter, occupied him several months, and the summer of 1846 had arrived before he was ready to visit Japan. On July 7 he sailed with both vessels from the Chusan Islands, near Shanghai, for Yedo, which port he had decided to enter in preference to Nagasaki, where such opposition as the Dutch might offer would have to be encountered. On the 19th, on approaching Yedo Bay, he passed several Japanese junks, which gave him a wide berth, and on the following day he entered the bay, carefully picking his course by means of soundings and a lookout. When some twenty-five miles from Yedo, a Japanese officer, accompanied with a Dutch interpreter, boarded the flagship and motioned to the commodore that he had gone far enough. Not wishing to give offense, Biddle anchored at the place pointed out, which was on the south side of the bay, abreast a village. The adjacent country was beautifully green, and appeared to be well cultivated.

As soon as Biddle had anchored, he was surrounded by numerous boats, and many Japanese came on board the ships, a freedom that he permitted in order to convince them of his friendship and of his ability to defend himself.

Soon after the officer boarded the *Columbus*, he held a conference with the commander-in-chief. "He inquired what was was my object in coming to Japan," Biddle wrote to the Secretary of the Navy, "I answered that I came as a friend to ascertain whether Japan had, like China, opened their ports to foreign trade; and if she had, to fix by treaty the conditions on which American vessels should trade with Japan. He requested me to commit this answer to writing, and I gave him a written paper, a copy of which is herewith transmitted. He informed me that any supplies I might require would be furnished by the government. To my inquiry whether I would be allowed to go on shore, he replied in the negative." [20]

On the morning of the 21st another officer, apparently of higher rank, came on board the flagship. "He stated," said Biddle, "that foreign ships upon entering a port of Japan always landed their guns, muskets, swords, etc. I told him it was impossible for us to do so, that trading vessels only could be expected to do so, and I assured him that we were peaceably disposed, so long as they were. He informed me that my written paper of the preceding day had been transmitted to the Emperor, who was some distance from Yedo, and that an answer would be received in five or six days. I asked him why we were surrounded by boats, and he replied that they might be ready in case we wanted them to tow the ship. This, of course, was not true; the object, of course, being to prevent our communicating with the shore. When our boats were sent to sound at some distance from the ship, Japanese boats followed them, without, however, molesting them. During our whole stay these boats continued about the ship. I had on board copies, in Chinese, of the French, English and American treaties with China. I offered these treaties to the Japanese officer, who declined receiving them, saying that he could not receive them without the permission of his Emperor. I offered these treaties subsequently to other Japanese officers, who in like manner declined to receive them."

[20] For Biddle's account of his visit to Japan, see Sen. Doc., No. 59, 32 Cong., 1 sess., pp. 64-66.

The Japanese furnished the fleet with wood, water and provisions, refusing in accordance with their customs to accept remuneration. In watering the ships they at first sent off only small quantities. Annoyed by their procrastination, Biddle said to one of the officers that if they did not water the ship properly he would obtain a supply by sending his boats ashore. This threat had the desired effect, bringing forth an abundance of water. Concerning the eatables supplied by the Japanese, Mr. Charles Nordhoff, first-class boy on the *Columbus*, wrote thus:

An intimation having been given that some fresh provisions would be highly desirable, two large junks made their appearance from the upper harbor, bringing to us a supply of vegetables of various kinds and several hundred chickens. Among the vegetables were sweet potatoes, egg plants, carrots, and pumpkins. There was also a quantity of small green apples, the first we had seen since leaving home."

On the 25th Biddle, not having received an answer to the paper sent on shore five days previous, expressed his surprise to one of the Japanese officers at the delay, and requested him to inform the governor of Yedo that he wished an answer as early as possible. On the 27th an officer, accompanied with a suite of eight persons, approached the flagship in a junk, bringing the reply of the Emperor, and asked the commander-in-chief to come aboard the junk to receive it. An unfortunate occurrence now took place, which rather reflects upon the discretion of Biddle, as may be seen from his own account:

I refused, and informed the interpreter that the officer must deliver on board this ship any letter that had been entrusted to him for me. To this the officer assented, but added, that my letter having been delivered on board the American ship, he thought the emperor's letter should be delivered on board the Japanese vessel. As the Japanese officer, though attaching importance to his own proposal, had withdrawn it as soon as I objected to it, I concluded that it might be well for me to gratify him, and I informed the interpreter that I would go on board the junk, and there receive the letter. The interpreter then went on board the junk. In an hour afterwards I went alongside the junk in the ship's boat, in my uniform; at the moment that I was stepping on board, a Japanese on the deck of the junk gave me a blow or push, which threw me back into the boat. I immediately called to the interpreter to have the man seized, and then returned to the ship. I was followed on board by the interpreter and a number of Japanese officers. They all expressed the greatest concern at what had occurred, stated that the offender was a common soldier on

[11] Nordhoff, Charles, Nine Years a Sailor, 205.

board, and assured me that he should be punished severely. They asked in what manner I wished him punished, and I replied, "according to the laws of Japan." I stated that the officers were greatly to blame as they ought to have been on deck to receive me. They declared that they had not expected me alongside, and I was subsequently convinced that, owing to bad interpretation, they believed my final decision had been that they were to come to the ship. I was careful to impress upon all the enormity of the outrage that had been committed, and how much they owed to my forbearance. They manifested great anxiety and apprehension, and endeavored in every way to appease me. In the course of the day, the governor of Yedo sent an officer to inform me that the man should be severely punished, and that he hoped that I would not think too seriously of the affair. The conduct of the man is inexplicable, especially as all the Japanese in and about the ship had evinced great good nature in all their intercourse with us."

The delivery of the Emperor's letter was finally made on board the *Columbus* by the Japanese officer, who was accompanied by the Dutch interpreter and his suite. The letter was without address, date, signature, or seal. These omissions indicated not so much disrespect for the Americans as an unwillingness to have official intercourse with them and a desire to discourage their return. The letter was partly written in Chinese, and partly in Japanese, in accordance with the reputed usage of Japan. It was enclosed in a cover upon which were the words "explanatory edict," a term applicable only to an act of the Emperor. As translated by the American legation at Canton, it read as follows:

The object of this communication is to explain the reasons why we refuse to trade with foreigners who come to this country across the ocean for that purpose.

This has been the habit of our nation from time immemorial. In all cases of a similar kind that have occurred we have positively refused to trade. Foreigners have come to us from various quarters, but have always been received in the same way. In taking this course with regard to you, we only pursue our accustomed policy. We can make no distinction between different foreign nations—we treat them all alike; and you, as Americans, must receive the same answer with the rest. It will be of no use to renew the attempt, as all applications of the kind, however numerous they may be, will be steadily rejected.

We are aware that our customs are in this respect different from those of some other countries, but every nation has a right to manage its affairs in its own way.

The trade carried on with the Dutch at Nangasacki is not to be regarded as furnishing a precedent for trade with other foreign nations. The place is one of few inhabitants and very little business, and the whole affair is of no importance.

In conclusion we have to say that the Emperor positively refuses the permission you desire. He earnestly advises you to depart immediately, and to consult your own safety by not appearing again upon our coast."[19]

When the substance of this admirably plain, clear and dignified statement of Japanese custom and polity had been translated to Biddle by the Dutch interpreter, he said to the officer that the United States wished to make a treaty with Japan, but not unless Japan also wished a treaty; that he came to Yedo for information on this subject; and that, having ascertained that the Japanese were not yet prepared to open their ports to foreign trade, he should sail on the following day. The officer asked Biddle to commit his answer to writing, a request that was readily granted.

On the morning of July 29, after an interesting stay of ten days in Yedo Bay, during which time hundreds of Japanese visited the *Columbus* and *Vincennes*, Biddle ordered the anchors to be weighed. To hasten his departure, several hundred native boats, the wind blowing light, towed the ships out to sea. He left the Japanese rejoicing at having rid themselves so easily of their unwelcome guests. The *Vincennes* returned to China, and the *Columbus* went to the west coast of America, which she reached in time to participate in the Mexican War.

Mr. Alexander H. Everett, the American commissioner to China, was of the opinion that Biddle's attempt to open negotiations with the Japanese "placed the subject in a rather less favorable position than that in which it stood before." Another eminent authority, Commodore Stephen B. Luce, a midshipman on the *Columbus*, takes the view that Biddle's courteous and conciliatory bearing toward the Japanese predisposed them to look with favor upon those Americans who subsequently visited their country. The statements of both Everett and Luce may be in a measure correct. In consenting to go aboard the junk, Biddle was evidently indiscrete, and the incident was used by the natives to discredit the Americans. On the other hand, the presence of an armed fleet in the bay of Yedo and Biddle's amicable and judicious relations with the Japanese officials gave them a favorable impression of the strength, candor and justice of the great Western republic. Biddle must be awarded the distinction that attaches to the pioneer, for he was the first American naval officer to anchor a fleet in the waters of Japan, to hold intercourse with the officials

[19] Sen. Doc., No. 59, 32 Cong., 1 sess., p. 68.

of that country, and to acquire a firsthand knowledge of its people and customs. Those who came after him had the advantage of his experience."

After Everett's return home from Rio Janeiro in 1845, his health improved, and in the following year he went to China and entered upon his duties as commissioner. He was again granted power to negotiate a treaty with Japan, but died before an opportunity for exercising it presented itself. During the term of office of his successor, Mr. John W. Davis, an occasion arose for sending a national vessel to that country. Davis, on being notified by the consul of the Netherlands at Canton, on the authority of the Dutch superintendent at Deshima, that fifteen American sailors were imprisoned at Nagasaki, advised Commodore David Geisinger, the commander-in-chief of the East India squadron, to send a vessel to Japan to obtain the release of the prisoners. Accordingly, on January 31, 1849, Geisinger ordered the national ship *Preble*, Commander James Glynn, to proceed at once to Nagasaki and demand the surrender of the fifteen sailors and of any other Americans confined in Japan. In case he failed at Nagasaki, Glynn was to go to Yedo and communicate with the Imperial court respecting the sailors. He was directed to be "conciliatory, but firm," and to pay due respect to the Japanese laws and customs.

Glynn's voyage to Japan was the chief event of his naval career, which otherwise was not especially notable. He entered the navy from Virginia in 1815, and reached the grade of lieutenant in 1825, commander in 1841, and captain in 1855. In 1861 he was retired as captain, and four years before his death, in 1871, he was promoted to be commodore on the retired list. In February, 1848, he took command of the *Preble* at Callao, and in May sailed from San Blas for Macao, with Commodore Geisinger on board. The *Preble* was rated as a 16-gun sloop, and on her voyage to Japan carried one hundred and forty-one men.

The sailors, whose release Glynn was ordered to obtain, had belonged to the American whaler *Lagoda*, Captain John Brown, of New Bedford. In June, 1848, they deserted their vessel on the northwest coast of Japan, and after cruising along the shore several days, were arrested by some Japanese officers and taken to

[11] Sen. Doc., No. 59, 32 Cong., 1 sess., 15, 19, 69; Proceedings of the United States Naval Institute XXXI, 557.

Matsumai, where they were imprisoned. Thence in accordance with Japanese law, they were conducted to Nagasaki and confined there. They were suspected by the Japanese of being spies, and their repeated and often successful attempts to break jail confirmed the suspicion. During their imprisonment, which was somewhat rigorous, one of them hanged himself, and another died of fever. Mr. J. H. Levyssohn, the superintendent of the Dutch factory at Deshima, interested himself in the unfortunate men, relieving their most urgent wants and communicating a statement of their case to the Dutch consul at Canton. Five of the men were Americans and ten Sandwich Islanders.

The *Preble* sailed from Hong Kong on February 12, 1849, but was obliged soon to return to port owing to the appearance of small pox on board, and did not again go to sea until March 22. After calling at the Lu-chu Islands where she spent three days, she finally, on April 17, made land near Nagasaki. On the following day, having anchored some distance from the town, she was boarded by a Japanese officer, Moreama, accompanied with eigth "assistants." Moreama spoke English, and at once conferred with Glynn, who assumed a tone and manner that he maintained uniformly throughout his stay. Believing that Biddle's dealings with the Japanese had been too kindly and conciliatory, he decided to try the efficacy of rigorous firmness, cool assurance, and a severity of demeanor. When Moreama asked, "With all respect, may I be informed of your object in coming to Japan," Glynn evaded the question, saying that he came on important business with the government. To Moreama's next question, "Did you receive a paper?" Glynn replied: "No; one of your boats came alongside, and threw on the deck of this ship a bamboo stick, in which was stuck a paper. If this paper was intended for me, it was not the proper manner to communicate with me, and I ordered it to be immediately thrown overboard. I am ready to receive all communications which come to me in a proper and respectful manner." Moreama said that his purpose in boarding the ship was to acquaint its commander with the proper anchorage, which he pointed out on a chart. Glynn now raised objections, saying that his present anchorage and the one pointed out were unsafe, that in order to secure his ship in case of heavy weather it was necessary for him to anchor her inside the harbor, and that he intended, on the departure of his visitors, to get

under way and stand in. After parleying over the point for a time, Moreama yielded it, and the *Preble* was anchored in the harbor, abreast the island of Happenberg, below the town and the Dutch factory, with which places communication was by boat."

At Nagasaki the arrival of Glynn caused great commotion. Some six thousand troops were assembled there, the forts of the town were strengthened with recruits, and a cordon of boats was placed around the *Preble* to prevent communication with the natives. Forbidden to visit the strange vessel in the harbor, the Japanese used the battlements of Nagasaki as a vantage-point from which to view her. Not the least excited of those on shore were the American prisoners, whose spirits revived at the prospect of release.

Soon after the ship reached her anchorage near the island of Happenberg, she was boarded by a "high military chief," Serai Tatsnosen, who was accompanied by Moreama as interpreter. After ascertaining that the visitor's rank and credentials were satisfactory, Glynn entered into conversation with him, answering his questions respecting the purpose of the mission and the character of the ship. The visitor also had some interesting information to impart, namely, that an American of whom Glynn had had no previous knowledge was confined at Nagasaki, and that two of the *Lagoda's* sailors were dead. He offered to furnish gratuitously any refreshments of which the *Preble* stood in need, but Glynn refused to accept them unless permitted to pay for them, which permission was refused.

On the 19th a second high military chief, Matsmora Schal, visited the American commander to present the compliments of the governor of Nagasaki and that official's congratulations on the safe arrival of the *Preble*. After answering the visitor's questions respecting the objects of the voyage of the *Preble*, her dimensions, the age of her commander, and the size of the American navy, Glynn presented him with a letter for the governor requesting the release of the prisoners. On the 22d Matsmora Schal returned to say that the governor had received the letter. Glynn asked him when an answer was to be expected and whether the men were to be given up, but was unable to obtain a satisfactory reply. On the same day, the 22d, a message was received

[11] For the principal documents relating to the voyage of the *Preble*, see Sen. Doc., No. 59, 32 Cong., 1 sess., pp. 2-63.

from Levyssohn stating that the governor had requested him to translate Glynn's letter; that he had intimated to the governor the necessity of releasing the men; and that, impressed with the fact that the governor could not legally act on their case without a special order from the Emperor at Yedo, he had proposed that the men be delivered to him at the factory to be conveyed thence to the *Preble*.

On the 23d Serai Tatsnosen returned to the ship, and an interview took place in which Glynn spoke with unusual candor and brusqueness. His speech had also a note of Occidental conceit and superiority, such as has often marked the intercourse of the Western peoples with those of the East. It was evidently intended to operate upon the fears of the Japanese. Glynn thus describes the dialogue between himself and his visitor:

Chief to Commander Glynn.—I am happy to see you, sir. The shipwrecked Americans, as I stated to you in my conference of the 18th, are in Nangasacki. I have come to-day to say that Mr. Levyssohn called upon the governor of Nangasacki in relation to the demand contained in your letter to the governor for the release of your countrymen. Mr. Levyssohn begged the governor to set aside the usages of Japan, which must (if the governor insisted upon them) keep the Americans here until a period of thirty-five or forty days should elapse, and to give the men to the officer who had been sent for them; that he (Mr. L.) would take the men and deliver them to the commander of the *Preble*, etc., etc. I have come to tell you that day after to-morrow Mr. L. will call and see you on board your ship.

Answer.—Sir, I am obliged to you for your politeness, and hope you are well. I have heard what you have said. I am displeased at it. I cannot stay here from day to day under such pretences. I have other duties to perform, and it is necessary my business should be despatched quickly. You say that Mr. Levyssohn has "begged the governor," etc., etc. I, too, beg that my shipwrecked countrymen should be restored to their homes. But understand me, I came here to treat with your governor, not with Mr. Levyssohn, or any other individual. I am under positive orders to demand from the governor of Nangasacki the release of the Americans in his hands. I want to know decisively if I am to get the men. I want the chief to reply to my question.

Chief.—This cannot be. Why not stay a few days? You will get the men, I think.

Question by Commander Glynn.—Do you say that I can get the men day after to-morrow?

Answer.—No; not day after to-morrow. The day after to-morrow Mr. Levyssohn will come and see you on this business, and afterwards, I cannot say how long, I think you will get your sailors. Mr. Levyssohn will send you a letter to-day.

Question.—Well, your answer is very far from satisfying me. It is necessary for me to see Mr. Levyssohn. Then I will go now, and call on him at Decima.

Answer.—You cannot, for he is sick.

Question (to the interpreter).—Is it necessary for the governor to get permission from the Emperor before giving up the men?

Answer.—Yes.

Commander Glynn to the interpreter.—"Yes." Well, that is enough for me to hear.

Interpreter.—But stop; pray hear me. What do you do so for (alluding to the gestures of Commander Glynn)? It is not good, it is not Japanese custom.

Commander Glynn.—Well, it is my custom. It is the custom of my country, under such circumstances; and if it is necessary to send to the Emperor before giving me these shipwrecked men, I cannot stay here. My government knows very well how to recover its citizens. You need not point to your chief. I am as great as he is. You must look me in the face when speaking to me. So far as I am concerned, this matter is settled. You need say no more. I do not know any one in this business except the governor. I know no other person; nor do my orders require that I should speak to any one but the governor. If you will promise that on the day after to-morrow the men will be given up, then I will stay. If this promise cannot be given, then I have no farther business here; my errand is at an end. I will get under way to-day—yes, in five minutes—and report to my government that you decline complying with my demand for the release of the men.

Answer (with much trepidation).—Mr. Levyssohn will call on you in two days. I will do all I can, and exert my influence with the governor to give you the men soon. "I think" you may expect it and—

Commander Glynn.—Stop! Your policy is very apparent. Now, I do not want to know what you "think"; you have had ample time, certainly, to think. I can think also. I have thought a great deal. It is time that matters should come to a crisis—that something definite was arrived at. I have been here five days—a time full enough for the governor to have come to some determination, and to have sent me a reply to my letter. You put me off from day to day on the merest pretences, and up to this moment you refuse to let me know if my demands are to be denied, or not. I want a "positive promise" as to whether I am to get the men or not. Under such a promise I will give two days; more I must not, cannot give. Will you give me this promise?

Answer.—I cannot promise. I think after you have seen Mr. Levyssohn, you will get the men soon.

Commander Glynn.—I understand very well the meaning of this delay, nearly as well as you do. I think I will go to the governor myself, and there can be no better time than to-day. Can I see him?

Answer.—No; you cannot go to the governor. I will tell the governor and do all I can to have your business finished. In two days you cannot get the men—in three days, I think. Day after to-morrow Mr. Levyssohn will speak to you. He has talked with the governor about it.

Commander Glynn. It is useless to talk to me in this manner. I want no prevarication. I want a straight up and down answer. I have already waited five days—four days too long; and now I want to know something more than "I think." You give a direct reply to my question, and I will do the thinking. I will stay three days—certainly no longer—but you must promise me now that in three days you will deliver up the men. Do you promise?

Answer.—Yes; in three days you shall get possession of the men—I mean the day after the second day from now.

Commander Glynn.—Very good (offering his hand to the chief, who took it). I rely upon your word—upon the solemn promise of a Japanese chief. I place full confidence in your honor. I believe that you will fulfil your promise.

During the whole of this conference, there was a constant reference by the interpreter to the principal chief, "Tatsnosen," and his associates. The conference ended, the chief walked around the ship, inspected the crew at general quarters, etc.[15]

From the speeches of the Japanese official, it is evident that the governor had accepted the suggestion of Levyssohn. On the 25th the Dutch superintendent, being still sick, sent his representative to the ship to present Glynn with an official account of the confinement of the prisoners. This was much more favorable to the Japanese than the account given by the prisoners, who claimed to have been harshly treated. On the following day a high military chief, Hagewara Matasak, appeared on board the *Preble*, chiefly for the purpose of making this brief speech to Glynn: "To-day you will get your countrymen. After they come on board your ship, it is the verbal order of the governor for you to go away." Levyssohn's representative and another Dutchman from Deshima next arrived, and they presented Glynn with some papers from the Japanese government. Shortly after they left, a boat flying the Dutch flag came alongside the *Preble* and delivered fourteen sailors—thirteen of them from the *Lagoda*, and one, Ranald McDonald, from the American whaler *Plymouth*, of Sag Harbor. Desirous of obtaining a knowledge of the Japanese, McDonald had, at his own request, been set adrift in a boat on the coast of Japan, and, after an experience similar to that of the deserters of the *Lagoda*, was taken to Nagasaki.

On the morning of the 27th the *Preble* sailed for Shanghai, where she arrived six days later. Notwithstanding the signal success of Glynn's mission, he seems to have received no marks of official favor or appreciation. Some credit for its success doubt-

[15] Sen. Doc., No. 59, 32 Cong., 1 sess., pp. 35-36.

less belongs to Levyssohn, who well merited the thanks tendered him by Glynn. The visit of the *Preble* to Japan marked a distinct advance in our intercourse with that country. While the *Manhattan* had returned some Japanese to their native land, the *Preble* had performed the much more difficult task of obtaining the release of Americans confined in Japan.

XII.

THE OPENING OF JAPAN: 1851-1854.[11]

The philosophical historian, powerless to predict with accuracy before the event, but wonderfully wise with explanations after it, is likely to discover numerous "causes" of the opening of Japan. He finds the times ripe for loosening the fetters that bound that country to an obsolete policy, and the circumstances unmistakably pointing toward America as the country destined to achieve the great work. Thus, a young Japanese author, schooled in the historical method of an Occidental university, enumerates the following as causes leading to the inception of the American expedition: on the one hand, the safety of American whalers on the coast of Japan, the rise of industrial and commercial commonwealths on the Pacific, the discovery of gold in California, the increasing trade with China, the development of steam navigation necessitating coaling depots and ports for shelter, the opening of highways across the Isthmus of Central America, the missionary enterprises on the Asiatic continent, and the rise of the Hawaiian Islands; and on the other hand, the knowledge of foreign nations among the ruling classes of Japan, the news of the British victory in China, the progress of European settlements in the Pacific, the dissemination of Western science among a progressive class of Japanese scholars, and the advice of the Dutch government to discontinue the antiquated policy of exclusion.[11] These

[11] This chapter is based chiefly on the East India Squadron Letters, 1851-1855; Sen. Ex. Doc., No. 59, 32 Cong., 1 sess., pp. 57-62, 73-82; No. 34, 33 Cong., 2 sess.; American Historical Record, III, 148-149, 294-296; Hawks, F. L., Narrative of the Expedition of an American Squadron to the China Seas and Japan, Vol. I; Spalding, J. W., Japan and Around the World, 101-344; Taylor, Bayard, A Visit to India, China, and Japan, 360-465; Nitobe, I. O., The Intercourse between the United States and Japan, 38-54; and Griffis, W. E., Matthew Calbraith Perry, 281-374.

[11] Nitobe, I. O., The Intercourse between the United States and Japan, 38-39.

are undoubtedly pertinent facts, and from them it may be seen that the opening of Japan by the United States, like every other historical happening, bears a definite relation to certain antecedent conditions; but they by no means prove that the event flowed irresistibly out of those conditions. Had Great Britain, and not the United States opened Japan, the philosophical historian would have discovered in that fact no reason for astonishment, but on the other hand he would possibly have explained it as the inevitable effect of numerous causes, such as the gradual extension of British influence in the Far East, the predominance of Great Britain in Oriental commerce, her opening of China in 1842, her several attempts to open Japan, her surveys of Japanese waters, and the need of her shipwrecked seamen cast away in Japan for protection.

To a writer who is somewhat skeptical of the probative value of historical causes, it will not be necessary to go far afield in explaining the decision of the American government in 1851 to make another attempt to establish commercial relations with Japan. On January 6 of that year Mr. Aaron H. Palmer, of Washington, wrote a letter to President Fillmore, in which he recommended the sending of a mission to Japan, entrusted to a special commissioner and supported by an imposing squadron. Fillmore referred this letter to his Secretary of State, Daniel Webster, with whom Palmer several times conferred respecting his proposal. In January, 1851, the *Preble* arrived at New York, and Commander Glynn shortly went to Washington, where he doubtless laid before the government the details of his cruise and urged upon it the need of the United States for a coaling depot in Japan, a project he strongly favored. In June, under order from the President, Glynn prepared a statement of his views respecting the opening of Japan.

Early in May Commodore J. H. Aulick, who had been selected to succeed Commodore P. F. Voorhees, as commander-in-chief of the East India squadron, and who was then preparing his flagship, the *Susquehanna*, for a voyage to China, proposed to Secretary Webster that the returning to their native land of several Japanese sailors who had been picked up at sea and had been brought to San Francisco might afford a favorable opportunity for establishing commercial relations with Japan. Webster was favorably impressed with Aulick's proposal, and he at once

brought it to the attention of President Fillmore, who, after discussing it with his cabinet, decided to establish a mission to Japan, to entrust it to Aulick as an envoy of the United States, and to empower him to negotiate a treaty with the Japanese government. In a letter from Fillmore to the Emperor, dated May 10, 1851, the objects of the proposed negotiations were stated to be the establishment of friendly commercial intercourse and the obtaining of a coaling depot. A letter of credence from Fillmore to Aulick was dated May 30, and Aulick's instructions from Webster bore the date of June 10. These latter he probably did not receive until he reached his station, since he sailed from Old Port Comfort on June 8.[11]

As Aulick had suggested the mission, and as he had previously visited the Far East, his appointment to negotiate a treaty with Japan was a most fitting one. His squadron was composed of three vessels, the flagship *Susquehanna*, Captain William Inman, and the sloops of war *Plymouth*, Commander John Kelly, and *Saratoga*, Commander W. S. Walker. The *Susquehanna* was a steam frigate, bark-rigged, and was the first American steam vessel of war to visit the Orient. Secretary of the Navy Graham regarded this small fleet as quite sufficient for the performance of the duties entrusted to Aulick. To the secretary, the expedition to Japan was merely incidental to the regular work of the squadron, and no special preparations for it were made. On the outward voyage Aulick conveyed several distinguished passengers to Rio Janeiro, namely, the Chevalier S. de Macedo, minister of Brazil to the United States; Mr. Robert C. Schenck, United States minister to Brazil, and Mr. J. S. Pendleton, charge d'affaires to the Argentine Republic.

Unfortunately for the commodore, and mainly as a result of his irascibility, some unpleasant incidents occurred on the voyage to Rio Janeiro and after reaching that city. He and his captain quarreled over their respective duties on shipboard, and so serious were their differences that each wrote to the Secretary of the Navy making charges against the other. Aulick asked the secretary either to detach Inman or to allow him a commander, adding that

[11] Palmer, A. H., Documents and Facts Illustrating the Origin of the Mission to Japan, 5, 22; Davis, G. L., Origin of the Japan Expedition, 7; American Historical Record, III, 148-149, 294-297; Sen. Ex. Doc. No. 59, 32 Cong., 1 sess., 57, 74, 80-82; Executive Letters, U. S. Navy Department Archives, January-May, 1851, 123.

if neither of these requests could be granted, he wished to be relieved from his command at the earliest day consistent with the good of the service. Greatly incensed at the quarrelling officers, the secretary sharply reproved both of them, using these words in a letter to Inman:

> Were it not that the public interests might suffer by the recall of the *Susquehanna*, the Department would not hesitate to order her return for the purpose of relieving the two senior officers as wholly disqualified, under the temper which they have evinced, to carry out any important instructions of their government."

During the voyage to Rio Janeiro, Minister Schenck discovered, or thought he discovered, certain facts gravely reflecting upon the conduct of Aulick, and he therefore wrote to the State Department making a "painful and mortifying" disclosure respecting that officer. He charged him with allowing Minister Macedo to make the passage to Rio Janeiro under the impression that he was being entertained at the expense of the commander-in-chief, when as a matter of fact the United States government was paying for his entertainment. The whole affair was trivial, and should never have been made the subject of a communication to the State Department. Schenck's charges reached Secretary Webster about the middle of November, 1851, and he at once forwarded them to Secretary Graham, who on the 17th of that month wrote to Aulick asking for an explanation. On the following day, as the President had in the meantime decided to remove Aulick from his command "in order to satisfy Brazil," Graham wrote again, directing him to remain at Hong Kong or Macao until his successor as commander of the squadron should arrive there.

These letters reached Aulick a few days after his arrival in China, and, astonished and mortified beyond measure, he at once replied to Schenck's charges, denying them absolutely and supporting his denials by the testimony of his officers. Ill at ease, and often incapacitated for duty by sickness, he remained on his station more than a year, awaiting the arrival of his successor. Finally, in March, 1853, he left China for America, taking the overland route and stopping at London. On reaching Washington he requested the Secretary of the Navy to institute an official investigation of his conduct, if he were dissatisfied with the explanations already made to the Department. The secretary assured him that the explanations were "full, complete and satisfactory," and that the ordering of a naval court was not deemed

necessary. It later appeared, however, that Schenck's charges were partly true, for Macedo had been under the impression that Aulick was paying for his mess aboard ship, a misapprehension that arose from no intentional deception on the part of his host.

Aulick's tour of duty in the Far East was his last sea service. In 1867 he was promoted to be commodore on the retired list, and three years later he died in Washington. To the end of his life his recall was a sore point, and he never forgave the Navy Department for snatching from him the honor of opening Japan, which he conceived to be practically within his grasp.[19]

On the same day that Secretary Graham wrote to Aulick to await in China the arrival of his successor, he addressed a letter to Commodore Matthew C. Perry, who was stationed at New York, ordering him to proceed at once to Washington to confer with the Department. When Perry arrived at the capital, Graham and Secretary Webster were too busy to discuss with him his selection as Aulick's successor, the purpose of his visit. Graham therefore directed him to return to his station and await the instructions of the Department. Shortly after his return, he wrote a letter to Graham expressing his views respecting the proposed assignment of duty. He said that he much preferred to be commander-in-chief of the Mediterranean squadron, since in time of peace that office was the most desirable in the gift of the Secretary of the Navy, and the one conferring the most honor. He was willing, however, to accept the office offered to him provided the sphere of action of the East India squadron and its force were so enlarged "as to hold out a well-grounded hope of its conferring distinction upon its commander." He was of the opinion that the object of the government respecting Japan could not be attained without greatly augmenting the fleet in the Eastern seas.

On January 14, 1852, Graham again ordered Perry to report at the Department in Washington. It was probably before that date that President Fillmore considered the subject of the Japan mission with his cabinet; and (quoting his own words used in 1874) "it was finally determined to send an expedition expressly to Japan and Commodore Perry was selected to take the command. Instead of sending a single ship, it was thought best to send a

[19] Executive Letters, June-December, 1851, 74; Confidential Letters, II, 267-268; East India Squadron Letters, 1851-1853, 155-170; National Intelligencer (Washington), Dec. 19, 1853; Jan. 3, Jan. 9, 1854.

somewhat formidable and imposing fleet, as the show of power might be deemed a persuader with that people in procuring a treaty."[28]

Commodore Perry belonged to a family already distinguished for its naval achievements before he shed lustre upon it. His father, Captain C. R. Perry, had served in both the Revolutionary navy and the early navy under the Constitution, and his brother, Commodore O. H. Perry, had won the victory at the battle of Lake Erie, which he announced in those well-known words: "We have met the enemy and they are ours." In the War of 1812 Matthew C. Perry had served as a subordinate officer on board the frigate *President*, and after that conflict he had had a varied career at sea and on shore, assisting in the suppression of piracy, in founding a colony in Africa, in establishing a steam navy and a naval apprentice system, and in improving the naval ordnance. In 1843, as commander of the African squadron, he pursued, with remarkable success, a "powder and ball" policy in dealing with the natives of the west coast of that continent, and during the Mexican War he commanded one of the largest squadrons ever assembled under the American flag. At the time of the expedition to Japan he was fifty-nine years old, having spent forty-three years in the navy.

On March 24, 1852, Secretary Graham formally directed Perry to take command of the East India squadron, then consisting of the *Susquehanna*, *Plymouth* and *Saratoga*, in China. To these ships were added the steam frigate *Mississippi*, the first-class steamer *Princeton*, and the storeship *Supply*. The *Mississippi*, Perry's flagship in the Mexican War, was designated as the flagship of the squadron until the commodore should reach his station. She was one of the pioneer steam vessels of the navy, having been built in 1841. She was burnt and sunk on the river that bears her name in 1863.

During most of the year 1852 Perry was busy preparing for his expedition. The procuring of charts and books relating to Japan early engaged his attention, and in the spring he visited Albany, Boston and New Bedford in the interest of his mission. The governor and officials of New York gave him several valuable publications of that State, and the textile manufacturers of Massa-

[28] American Historical Record, III, 149; Letters to Officers of Ships of War, XLVI, 226, 332; Captains' Letters, July-December, 1851, 136.

chusetts supplied him with specimens of cloth. From numerous sources he obtained curios, arms and various articles illustrative of the progress of the mechanical arts. At New Bedford the owners and masters of whaling ships gave him information respecting the cruising grounds and the usual ports of resort of their vessels. Two artists and an agriculturist were engaged, and rated as officers of the navy, as Perry was resolved to admit no one on board his ships who was not subject to naval discipline. He was exceedingly careful to select able and discrete officers. Commander H. A. Adams was made captain of the fleet, and Commanders Franklin Buchanan and Sidney Smith Lee received important offices. Lieutenants John Contee and Silas Bent were attached to the *Mississippi* as flag lieutenants, the last-named having served with Glynn on the *Preble*.

The *Supply* was the first ship to sail, leaving New York in May (1852). The *Princeton* and *Mississippi* were not ready until fall, by which time the Department had decided to add to the squadron the ship of the line *Vermont*, the corvette *Macedonia*, the steamer *Alleghany*, the sloop of war *Vandalia*, and the storeship *Southampton*. On November 8 President Fillmore and Secretary of the Navy Kennedy visited the *Mississippi*, then at Annapolis, to bid the commodore good bye. A few days later she proceeded to Norfolk where she was joined by the *Princeton*. The latter vessel on her passage from Baltimore down the Chesapeake proved to be so defective that Perry decided to go to sea without her, and accordingly on November 24 he sailed from Norfolk for China, with a single ship of his squadron, the *Mississippi*.

Before his departure, Perry received from the government at Washington the various official documents relating to his mission: a letter of credence signed by President Fillmore; a letter addressed to the Emperor of Japan signed by Fillmore, countersigned by Secretary of State Edward Everett, and drafted by Secretary of State Daniel Webster, who had recently died; sailing orders from the Navy Department; and instructions from the State Department, bearing the signature of Acting Secretary of State C. M. Conrad. The last-named document expressed best the expectations of the government. The objects of the expedition were stated to be, first, the protection of American seamen and property in Japan and Japanese waters; second, the opening of one of or more ports to American vessels for the obtaining of

supplies, and third, the opening of one or more ports for purposes of trade. Perry was directed to try first the efficacy of argument and persuasion. If he failed by the use of these means, he was to change his tone and inform the Japanese in the most unequivocal terms that the American government would insist that all its citizens who temporarily sought refuge in Japan on account of shipwreck or stress of weather should be treated with humanity, and that it would chastise severely any one who should practise upon them acts of cruelty. He was to bear in mind, however, that the President had no power to declare war, that the mission to Japan was necessarily of a pacific character, and that force was not to be used except in self-defense. The coasts of Japan and the adjacent islands were to be surveyed, provided it could be done without interfering with the main object of the mission.[21]

The American government made no secret of the expedition to Japan, which, before Perry left the United States, had assumed the importance of an international event, arousing the interest of the whole civilized world. The public prints both at home and abroad commented freely upon it, generally wishing it good fortune, but gravely expressing their forebodings of failure. The *London Times* doubted "whether the Emperor of Japan would receive Commodore Perry with most indignation or most contempt." Rumors were circulated that the expedition was not a wholly pacific one. Joking on this aspect of it, *Punch* declared that Perry must open the Japanese ports even if he had to open his own. A Washington correspondent of the Baltimore *Sun*, comparing the sailing of Perry's fleet to the sailing of "Rufus Porter's aerial ship," insisted on the "abandoning of this humbug, for it has become a matter of ridicule abroad and at home."[22]

Before leaving the United States, Perry had pretty thoroughly familiarized himself with the literature relating to Japan, and during his voyage he continued his studies and also matured a plan of operations. From Madeira he wrote to the Secretary of the Navy recommending as a preliminary step in the negotiations the securing of one or more ports of resort in Japan or in the Lu-chu Islands. The President authorized him to carry out his recommendation, at the same time cautioning him to "make no

[21] Sen. Ex. Doc., No. 34, 33 Cong., 2 sess., pp. 7-8.

[22] Nitobe, I. O., The Intercourse between the United States and Japan, 43-44.

use of force, except in the last resort for defence." The President also approved another suggestion of Perry, the encouraging of the natives in the neighborhood of the ports of resort to turn their attention to agriculture in order that they might provide themselves with the means of supplying vessels.

On the outward voyage the *Mississippi* touched at Madeira, the Cape of Good Hope, Mauritius and Singapore for supplies, and finally arrived at Hong Kong on April 7, 1853, about a month after Aulick relinquished his command. Perry found on the station the *Susquehanna*, *Plymouth*, *Saratoga* and *Supply*. After visiting Canton and engaging the American missionary, Dr. S. W. Williams, as interpreter, he proceeded to Shanghai, where he assembled all his vessels, except the *Saratoga*, which he left at Macao under orders to await the arrival of Dr. Williams and join the fleet at the Lu-chu Islands. In the latter part of May all the vessels of the squadron, with the exception of the *Saratoga* which was left at Shanghai to guard American interests, arrived at Napa, Great Lu-chu Island. As the commodore had decided to make Napa a port of refuge, he spent several days there cultivating the friendship of the natives. On June 6, accompanied by a suite of officers, he visited the prince-regent at his palace and was hospitably received. During the stay of the fleet at Napa an exploring party, in charge of the Reverend George Jones, the chaplain of the *Mississippi*, penetrated the island in search of scientific information, and the harbors of Napa and Melville were surveyed.

While awaiting the arrival of a collier from Shanghai, Perry with the *Susquehanna* (now the flagship) and *Mississippi* visited Port Lloyd, Peel Island, situated some eight hundred miles eastward of Nagasaki. Here he purchased a tract of land for a coaling depot, surveyed the harbor, explored the island, and distributed some live stock and garden seeds among the settlers. After a brief stay he returned to Napa.

Finally the preparations were completed; and on the morning of July 2 the squadron, consisting of the steamers *Susquehanna* and *Mississippi* and the sloops of war *Saratoga* and *Plymouth*, set sail for the bay of Yedo, one thousand miles east-northeast of Napa. Perry had fully considered the policy that was to govern his dealings with the Japanese, and had fixed definitely its general lines. He decided not to resort to force, unless it was

absolutely necessary. Those courtesies which were due from one civilized nation to another he should demand as a right and not solicit as a favor. He should permit no petty annoyances, disregard all threats, and confer only with functionaries of the highest rank. By keeping himself in the background, surrounding his person with an air of mystery, and insisting upon elaborate formalities, he should strive to impress the Japanese with the importance of his mission and to win their respect.

On the morning of July 8, as the ships approached Yedo Bay, their decks were cleared for action, the guns were placed in position and shotted, and the crews were called to quarters. About five o'clock in the afternoon the fleet anchored off the town of Uraga on the west side of the bay, twenty-seven miles from the capital. It was immediately surrounded by Japanese boats, one of the most conspicuous of which came alongside the flagship, and a Japanese officer asked for the commander-in-chief. On learning that the rank of the officer was only that of a vice-governor, Perry refused to see him, but appointed Lieutenant Contee to confer with him. For this interview and the events of the following day, Perry's narrative is the best authority:

He was merely told, under instructions from me, that I had been sent on a friendly mission to Japan, with a letter from the President of the United States for the Emperor, and it was my desire to have a personal interview with a dignitary of the highest rank, in order to make arrangements for the delivery of copies and translations of the documents with which I had been charged, preparatory to the formal presentation of the originals.

He replied that Nagasaki was the only place, according to the laws of Japan, for negotiating foreign business, and it would be necessary for the squadron to go there; to which he was told that I had come purposely to Uraga, it being near to Yedo, and should not go to Nagasaki; that I expected the letter to be duly and properly received where I then was; that my intentions were perfectly friendly, but I would allow of no indignity, nor would I permit the guard-boats, which were collecting about the ships, to remain where they were, and if they were not immediately removed, I would disperse them by force. On having this interpreted to him, he suddenly left his seat, went to the gangway and gave an order which caused most of the boats to return to the shore; but a few of them remaining in clusters, an armed boat from the ship was sent to motion them away, at the same time showing their arms, which had the desired effect, all of them disappearing; and we saw nothing more of them near the ships during the remainder of our stay. Here was the first important point gained.

The vice governor shortly after took his leave, saying that he had no authority to promise anything respecting the reception of the President's

letter, but in the morning an officer of higher rank would come from the city, who might probably furnish some further information.

On the following morning, the 9th, the governor of Uraga, Kayama Yezaimon, came on board, thus giving the lie to the vice governor, who declared himself of the highest authority in the city; and as this officer was of superior rank to the visitor of the day before, I directed that he should be received by Commanders Buchanan and Adams and Lieutenant Contee, still refusing to receive myself any one but a counsellor of the empire (cabinet minister).

The governor, after a long discussion in which he more than once declared that the Japanese laws made it impossible that the letter should be received at Uraga, that the squadron must go to Nagasaki, and even if the letter of the President were to be received at this place, a reply would be sent to Nagasaki. In answer to this he was told I would never consent to such arrangement, and would persist in delivering it where I then was; that if the Japanese government did not appoint a suitable person to receive the documents addressed to the emperor, I would go on shore with a sufficient force and deliver them, whatever the consequence might be.

On this being communicated to him, he said he would return to the city and send a communication to Yedo asking for further instructions; that it would require four days to obtain a reply; upon which he was told that I would wait until Tuesday, the 12th, three days, when I should certainly expect a definite answer. Accordingly he left the ship with the understanding that there would be no necessity for any further discussion until the time appointed for the delivery of the answer from Yedo should arrive.

At this interview the original letter of the President, together with my letter of credence, were shown to the governor, encased as they were in the magnificent boxes which had been prepared at Washington, the exquisite workmanship and costliness of which evidently surprised his excellency, and, on leaving the ship, he made an offer for the first time of supplies of water and refreshments, but was told that we did not stand in need of anything.

I had directed that a surveying boat, well manned and armed, from each ship of the squadron, should commence at daylight this morning, the 9th, the survey of the harbor and bay of Uraga, and thinking it quite possible, they might meet with some resistance, I instructed Lieutenant Silas Bent, in command of the surveying party, not to go beyond the range of our guns, and caused a lookout to be kept upon them, that assistance might be sent should they be attacked; but though they were followed by numbers of Japanese boats, they did not, on seeing our men well armed, venture to molest them.

The governor inquired what these boats were doing, and, on being told they were surveying the harbor, he said it was against the Japanese laws to allow of such examinations; and he was told that, though the Japanese laws forbade such surveys, the American laws command them, and that

we were as much bound to obey the American as he was the Japanese laws. Here was a second and a most important point gained.[28]

The following day, July 10, being Sunday, no communication was had with the officials. Early in the morning of the 11th, Perry ordered the surveying boats, under convoy of the *Mississippi*, to proceed farther up the bay toward Yedo, hoping thus to alarm the Japanese and induce them to give a satisfactory answer to his demands. Presently the governor came on board the *Susquehanna*, and asked why the vessels were sent up the bay. He was informed that, as the anchorage at Uraga was unsafe and inconvenient, a more favorable one was being sought nearer to Yedo, which the squadron would use the coming season, should it be necessary to return to Japan at that time.

On the morning of July 12, the day on which an answer from the Emperor was expected, the governor came on board the flagship, accompanied with two interpreters. He said that a misunderstanding had arisen respecting the proposed plan of the Americans to deliver first the translations and later the originals of the official documents. After much discussion, Perry consented to deliver both at the same time, provided a dignitary of the highest rank was appointed to receive them. The governor agreed to this, and said that an appropriate building for use as a council-house would be erected. He further stated that the Emperor's answer would be sent to Nagasaki to be delivered to the Americans by either the Dutch or Chinese superintendent there. Perry replied that he would not go to Nagasaki, that he would receive no communication through the Dutch or Chinese, and that he expected a reply of some sort to be delivered to him in Yedo Bay.

The place selected for a meeting was the village of Kurihama, near Uraga. At first Perry opposed this selection, saying to the Japanese that one of the houses or forts opposite the anchorage of his ships would be acceptable to him. Later, however, when informed by his surveying party that the fleet could be brought within gunshot of Kurihama and that large numbers of the natives were to be seen completing the building and transporting to it furniture and other articles, he made no further objections. On the 13th the governor presented the credentials of his highness, Toda, prince of Idzu, the representative of the Emperor,

[28] Sen. Ex. Doc., No. 34, 33 Cong., 2 sess., pp 46-47.

and they proved to be satisfactory. On the following morning the whole fleet was anchored in line so as to cover with its guns Kurihama and the adjacent shore. Under date of July 14 Perry has this entry in his notes:

"This being the day appointed for my reception on shore, and every preparation having been made for landing a formidable escort composed of officers, seamen, and marines, from the respective ships, about 400 in number, all well armed and equipped; and being ready for disembarcation, the two steamers moved to a position commanding the proposed landing-place (the sloops of war not being able to move for want of wind), and shortly after the detachment forming, the escort were in the boats and on their way to the shore, where they landed and formed, and were immediately followed by me.

The whole shore of the bay, extending more than a mile, was crowded with Japanese troops—from five to seven thousand—drawn up under arms. These troops were composed of cavalry, artillery, infantry and archers; some of the infantry with flint muskets, others with matchlocks.

On landing, I proceeded at once to the building erected for the purpose, and was there received by the prince of Idzu, first counsellor of the emperor, and his coadjutor, the prince of Iwami. To the former of these I presented the President's letter, my letter of credence, and three communications from myself, together with transcripts of the same in the English, Dutch, and Chinese languages, for which the prince of Idzu gave me a receipt.

The princes were attended by the governor of Uraga, the chief interpreter, and a secretary.

As it was understood that there was to be no discussion at this meeting, I remained but a short time, taking my departure and embarking with the same ceremony with which I had landed."[24]

To the commodore's concise account a few facts illustrative of the brilliant pageantry of the meeting may be added. At the head of the American party was a company of marines commanded by Major Zeilen; following them was a stalwart boatswain's mate, bearing the broad pennant, which was supported by two tall athletic seamen; then came two boys especially dressed for the occasion carrying in a envelope of scarlet the box containing the official documents; and next came the commodore with two black body guards, his staff, a suite of officers, two standard bearers, a company of sailors gaily uniformed, and the band of the *Mississippi*. The official documents were of folio size, beautifully written on vellum, and bound in blue silk velvet. Each seal was attached by cords of interwoven gold and silk with pendant gold tassels, and was encased in a box of rosewood, with lock, hinges

[24] Sen. Ex. Doc., No. 34, 33 Cong., 2 sess., pp. 50-51.

and mountings of gold. As a receptacle for the documents the Japanese had prepared a large lacquered box of a scarlet color, and supported by feet of brass or gilt.

The meeting place was a room in a thatched building, entirely open on one side and draped with gauze curtains. One the left of the room as you entered it were seated the princes of Idzu and Iwami, and behind them a considerable number of two-sworded mandarins. The prince of Idzu was garbed in a maroon silk robe, an over-garment of red, and blue cloth socks. His suite were attired in much the same manner. On the right side of the room were some ornamental chairs, placed there for the use of the Americans.

The conference opened with a few minutes of complete silence, both parties being seated. Tatznoske, the pricipal interpreter for the Japanese, was the first to speak, asking Mr. A. L. C. Portman, the Dutch interpreter of the Americans, if the documents were ready for delivery, and informing him that the prince of Idzu was ready to receive them. On this being interpreted to the commodore, he beckoned to the two boys, who came forward bearing the handsome boxes, and followed by two stalwart negroes. On reaching the receptacle prepared by the Japanese, the boys handed the boxes to the negroes, who opened them, took out the documents, and after displaying the writing and the seals laid them upon the lid of the receptacle. Under instructions from the commodore, Mr. Portman indicated to Tatznoske, who with the governor of Uraga was kneeling, the character of the several documents. Tatznoske then arose, and approaching the prince of Iwami prostrated himself and received from the prince a roll of papers, then crossing the room he fell on his knees before the commodore and presented him with it. After an interval of silence the commodore directed his interpreter to inform the Japanese that he would leave within a few days with the squadron for the Lu-chu Islands and Canton, to offer them his services if they wished to send dispatches, and to say that it was his intention to return again in the spring. When the Americans arose to depart, the two princes also arose and remained erect while their visitors filed out of the building, still preserving an absolute silence.

The roll of papers presented to the commodore by Tatznoske was an Imperial receipt for the President's letter, which, the

receipt stated, was received at Uraga, in opposition to Japanese law, because a refusal would have insulted the ambassador of the President. The receipt closed with these words. "The letter being received, you will leave here." To show the Japanese how little he regarded their command, Perry, on returning to the flagship, proceeded toward Yedo with the whole fleet, a part of it resuming the work of surveying the bay. On July 15 and 16 the surveys were continued, and the boats of the *Mississippi* made soundings within six miles of the capital. The nearer the Americans approached Yedo, the more polite and friendly the Japanese became. On the 16th the governor brought numerous presents to the flagship, which Perry consented to accept on the condition that he be permitted to return the courtesy. The governor raised the invariable objection that the Japanese law forbade the acceptance of favors from foreigners, but he finally yielded, returning to the shore with gifts exceeding in value that of those he brought. "Here," wrote Perry, "was another point gained in the unprecedented circumstances of their consenting to exchange presents."

Perry's decision not to wait for a reply to the President's letter, but to return to China and come again in the spring was not only stated verbally to the princes, but was also committed to writing and sent to the Emperor. In reaching this decision he was moved by several considerations. It seemed best to him to give the Japanese government ample time for reflection and discussion, and not to press it for an immediate answer when it could offer valid excuses for refusing one. Moreover, his fleet was in need of coal and refreshments, the situation in China called for the presence there of several vessels, and by the following spring re-inforcements from America would have arrived on the station.

On July 17, having been nine days in Yedo Bay, the fleet weighed anchor and went to sea. The *Saratoga* proceeded to Shanghai for the protection of American interests there, and the other vessels to Napa, where Perry arrived on the 25th. After renting a coaling depot of the islanders, he sailed for Hong Kong with the *Mississippi* and *Susquehanna*, leaving the *Plymouth*, Commander John Kelly, at Napa, under orders to visit the Coffin Islands and take possession of them in behalf of the United States. Kelly made the outward voyage to the islands in October, and on the 30th of that month took possession of them, at Newport,

Hillsborough Island, by hoisting the United States flag, firing a salute of seventeen guns, and burying a copper plate and a bottle.[*]

In the fall of 1853, the East India squadron was mainly occupied with the protection of American interests in China, which country was then suffering from a civil war. Several vessels had lately arrived from America, the steamship *Powhatan*, sloop of war *Vandalia*, corvette *Macedonian*, and storeships *Southampton* and *Lexington*. Two other vessels, the *Vermont* and *Alleghany*, which had been promised Perry, were detached from his command by the new government at Washington that came in with President Pierce. Perry directed the work of the squadron from Macao, where he established himself on shore, together with the artists and surveying officers of the expedition, who were employed in arranging and collating the scientific information that had been collected.

In November the French frigate *Constantine* suddenly left Macao under sealed orders; and about the same time a Russian squadron arrived at Shanghai, having lately visited Nagasaki where its commander had attempted to open negotiations with the Emperor. These movements aroused Perry's suspicions, and fearing that the French and Russians might interfere with his plans, he decided to act promptly by returning at once to Japan. In January, he assembled at Napa all the vessels of his fleet that could be spared from China. On February 1 the sailing ships *Macedonian*, Captain Joel Abbot, *Vandalia*, Commander John Pope, *Southampton*, Lieutenant J. J. Boyle, and *Lexington*, Lieutenant J. J. Glasson, sailed for Yedo Bay, and six days later they were followed by the steamers *Susquehanna*, Commander Franklin Buchanan, *Mississippi*, Commander S. S. Lee, and *Powhatan*, Commander W. J. McCluney. On the 11th the *Southampton* arrived at the "American anchorage," ten miles above Uraga; and two days later she was joined by the remaining vessels of the fleet.

Soon after Perry left Yedo Bay in July, 1853, copies of President Fillmore's letter to the Emperor were sent to many of the principal rulers and dignitaries of Japan, requesting them to express unreservedly their opinion of it; and more than forty of them did so. They were almost unanimous in opposition to the opening of their country permanently to foreign commerce. Several, however, were willing to try the experiment for a limited

[*] Log of the *Plymouth*, U. S. Navy Department Archives, Oct. 30, 1853.

period. Declaring that "the policy of the barbarians is first to enter a country for trade, then to introduce their religion, and afterward to stir up strife and contention," the prince of Mito memorialized his government in favor of war. In the end, the Emperor decided to conciliate the Americans by granting them their less important demands, and at the same time to prepare his country for defense. New forts were constructed along the coast, numerous cannon and bombs were cast, and three hundred thousand patriots repaired to Yedo.[28]

Soon after the *Susquehanna* arrived at the American anchorage, some Japanese officers came alongside her with a message from the Emperor. They were referred to Perry's representative, Commander Adams, who they informed that the Emperor had given orders to receive the fleet in a most friendly manner, that he had appointed five commissioners of high distinction to meet Perry and consider with him the propositions contained in the President's letter, and that a town called Kamakura, about twenty miles below Uraga had been designated as the place of meeting. This news was highly satisfactory to Perry, with the exception of that respecting the meeting place, to which he strongly objected. On learning of his objections, the Japanese proposed Uraga, where they had already begun to erect a council-house. This proposal Perry also rejected, urging the inconvenience of Uraga and its unsafety as an anchorage for his ships. For more than a week the question of a meeting place was discussed, neither side being willing to yield to the other. Finally, to expedite a settlement, Perry sailed up the bay with his fleet within sight of Yedo and within hearing of its bells. Soon after this movement was effected, the Japanese, fearing that the Americans intended to visit Yedo, proposed that the meeting be held on the beach near Yokohama. As this place was quite suitable and convenient, Perry accepted it. Here the Japanese erected a council-house, and Perry moored his ships near by, covering with his guns the shore for a distance of five miles.

The president of the Japanese commission was Hayashi, prince counsellor, and chief professor of the Chinese language and literature at the Great University of Japan, a profound scholar and dignified gentleman. Three of the other four members had the rank of "princes." By March 8 the commissioners and Perry

[28] Nitobe, I. O. The Intercourse between the United States and Japan 48-51.

had completed their preparations for the meeting. The second landing of the Americans was marked by even greater pageantry than the first. As this feature is not especially dwelt upon by Perry in his official account, from which the following extract is taken, it may be passed over without further notice:

> At 11.30 a. m. on the day appointed, the escort, consisting of about five hundred officers, seamen, and marines, fully armed, embarked in twenty-seven barges, in command of Commander Buchanan, and, forming a line abreast, pulled in good order to the shore. The escort having landed and drawn up, I followed in my barge under an appropriate salute, and landing, was received by the escort and a party of Japanese officials, and conducted to the hall prepared for the conference, where I found in waiting the five commissioners, and was invited to be seated opposite the chief personage.
>
> At this moment salutes were fired from the howitzers mounted in the launches, of twenty-one guns in honor of the Emperor, and seventeen for the Japanese commissioners. This display in landing was made altogether for purposes of policy, in accordance with the reasons already assigned.
>
> After suitable interchanges of courtesy, I was requested to retire, with my suite, to an inner apartment, where the necessary business could be conducted undisturbed. Accordingly, accompanied by the captain of the fleet, the two interpreters, and my secretary, I withdrew with the commissioners to an adjoining room, separated from the principal hall by a flag suspended across the entrance. Refreshments having been served, a reply to the letter of the President presented in July last was handed to me and translated from the Dutch by Mr. Portman, and I replied to it verbally. I then handed to the chief commissioner a draught of a treaty, which I had previously prepared as the basis of one which I was desirous of negotiating with the Imperial government. This was accompanied by three other papers—one being a reply to the communication of the chief commissioner addressed to me from Uraga . . . ; another, a statement of my views with respect to the policy of bringing about a mutually advantageous compact between the United States and Japan . . . ; and the third, a memorandum . . . in further explanation of the motives which would govern me in conducting the negotiations, and asking for certain relaxations of the Japanese laws with respect to the squadron.[27]

On the conclusion of these preliminaries, the commodore informed the commissioners that a marine had recently died on board the *Mississippi*, and that he wished to bury his body at some suitable place on shore. The commissioners replied that the body would have to be taken to Nagasaki for burial. Perry raised objections to this disposition of it, proposing that it be interred on Webster Island, near the American anchorage. The commissioners strongly opposed this suggestion, but finally consented to permit the interment to take place at a spot adjoining

[27] Sen. Ex. Doc., No. 34, 33 Cong., 2 sess., pp. 125-126.

one of the temples in Yokohama. Perry was somewhat disappointed at the turn taken by the incident as he had hoped to acquire an interest in Webster Island with a view to subserving "some ulterior objects." On fixing the burial place of the marine, the first conference came to an end.

The Emperor's answer to the President's letter disclosed that he was willing to concede much respecting the relief of distressed mariners and the establishment of ports of resort, but that he was unwilling to open Japan for purposes of trade. At first Perry urged the commissioners to negotiate with him a treaty granting the United States the rights of commerce, threatening them with the possibility that his government would send out more ships and men "with instructions of more stringent import." He soon discovered, however, that it was impossible to obtain a concession of commercial privileges, and he therefore turned his attention to procuring favorable terms respecting the points conceded. The Japanese were willing to open two ports of resort for American ships, Nagasaki immediately, and one other port after five years. Perry obtained the substitution of Shimoda, a more convenient port, for Nagasaki, the designation of Hakodate as the second port, and the reduction of the interval preceding the opening of the second port to one year. He also obtained a provision granting shipwrecked sailors temporarily living at the two ports of resort considerable freedom of movement and complete immunity from such restrictions as the Dutch and Chinese were subjected to at Nagasaki, and he secured the concession to the United States of all privileges that should be subsequently granted to other nations. At his suggestion the right of sending an American consul to reside in Shimoda was granted.

Several conferences were held at the council-house near Yokohama before the treaty was completed on March 31, when it was signed by Perry and the commissioners. During the negotiations the Japanese and their visitors showed each other many courtesies. Presents were both given and received by them. Among those presented by Perry to the Japanese were a collection of rifles, muskets, swords, pistols and carbines, a cask of wine, one hundred gallons of whisky, several baskets of champagne, a box of perfumery, a telescope, two telegraphic instruments, three life-boats, one locomotive with tender, passenger car, and rails, four volumes of Audubon's Birds of America, eight baskets of Irish potatoes, and numerous agricultural implements. The natives were much

interested in the locomotive and telegraphic apparatus, which were set up on shore and operated for their instruction. The gifts presented by the Japanese included two bundles of rice, three hundred chickens, gold lacquered writing implements, paper boxes, and book cases, some pieces of pongee, crape and silk, twenty umbrellas and thirteen dolls.

Perry dined the commissioners and their retinues on board the *Powhatan*, receiving them with all the honors and attentious due to persons of high rank. The fleet displayed the Japanese flag, the first time this emblem ever floated from the mast-head of foreign ships of war. In accordance with the Japanese custom, the subordinates were not seated with their superiors. A table for the commissioners, Perry and his captains was spread in the cabin, while the lesser notables dined on the quarter-deck. The visitors did full justice to the American viands, and having eaten to satiety, they after the manner of their country wrapped up and took with them the remnants of the feast. One of the commissioners fancied a large cake and was presented with it by the commodore, together with some cordial. Under the mellowing influence of the American wines and liquors, the visitors became exceedingly social, and a few even hilarious. The friendship of Nippon and America was frequently toasted, and many sentiments of mutual good will were expressed by host and guest.

On the fourth day after the treaty was signed, Commander H. A. Adams was dispatched to Washington with a copy of it, taking passage on board the *Saratoga* for San Francisco. Perry's work in Yedo Bay was practically completed. Before leaving, however, he got his fleet under way and approached near enough to Yedo to ascertain that it could be destroyed by a few light-draft steamers carrying guns of the heaviest calibers. On April 18, the slower vessels having already sailed, Perry with the *Powhatan* and *Mississippi* left the scene of his great achievement and proceeded to Shimoda. Thence he visited Hakodate, and from that place returned to Shimoda. The harbors of these ports were surveyed, friendly relations were established with the local governments, and cemeteries for the burial of Americans were located. At Shimoda the commodore met the Japanese commissioners and together they adopted some new treaty regulations, relating in part to the limits near the two ports within which the Americans were to be free to go and come, the landing places for vessels,

and the sale of goods. Finally on June 28 Perry sailed for China by way of the Lu-chu Islands. At Napa he entered into a compact with the government, granting to Americans the same rights in the Lu-chus that the treaty of Yokohama gave them in Japan. On July 21 he arrived at Hong Kong.

For some time the commodore had been unwell, suffering from bodily ailments and worn out by the cares and duties of his trying office. In December, 1853, he had written to the Secretary of the Navy asking permission to return home when his negotiations with Japan should be completed. At Hong Kong he received the orders he had requested, and on September 11 he sailed from that port on the British mail steamer *Hindostan* for England by way of the Red Sea and the overland route. On January 11, 1855, he arrived in New York on the steamer *Baltic*, having been absent from the United States two years and two months. His flagship *Mississippi*, returning home by way of the west coast of South America, reached New York on April 22, and on the following day she was visited by Perry. As he left her to go ashore his broad pennant was hauled down, thus formally terminating his connection with the East India squadron.

The opening of Japan was a memorable achievement, whether viewed as an international spectacle, a difficult task, or an historical event. Its spectacular features arrested the attention and kindled the imagination of the whole civilized world. The surmounting of its difficulties might well have challenged the ablest statesmen of the century. Perry's success was in no small measure the result of a rare combination of strong qualities of character—firmness, sagacity, tact, dignity, patience and determination. The opening of Japan was one of the great historical events of the last century, the farreaching effects of which are still but partially revealed.

For several months after Perry's return to the United States, he was employed at Washington in preparing a history of his expedition. In 1856 this was published by the federal government in three large volumes at a total cost of three hundred and sixty thousand dollars.[28] On the completion of his labors as author and editor, he returned to his home in New York City, where he died after a brief illness on March 4, 1858.

(TO BE CONTINUED.)

[28] Griffis, W. E., Matthew Calbraith Perry, 385.

PROFESSIONAL NOTES.

Prepared by Professor PHILIP R. ALGER, U. S. Navy.

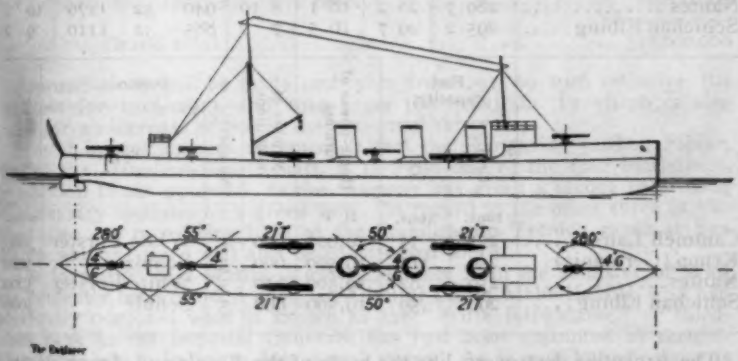
SHIPS OF WAR, BUDGETS AND PERSONNEL.

ARGENTINE REPUBLIC.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Rivadavia.....	28,000	Fore River Shipbl'dg Co.	Building.
Moreno.....	28,000	New York "	"

The accompanying sketch illustrates the new type of Argentine ocean-going destroyers now being built in England, France and Germany. The rigging and general arrangement shown in the sketch are those of the boats ordered in Germany and France, and differ from the vessels which



are being built at Cammell Laird's mainly in the number of funnels, of which there will be five in the English-built boats. The stern of the English boats will also slightly differ from the continental boats, but otherwise the whole flotilla—twelve boats—of new Argentine destroyers will be composed of practically identical ships.

It will be recalled that at the beginning of last year, after a competition which had lasted many months, the firms of Cammell Laird, Krupp (Kiel), Chantiers de la Brétagne (Nantes), and Schichau (Elbing) secured contracts for building respectively four, two, four, and two boats, the first twelve units of a powerful flotilla which is contemplated in the program of reconstruction of the Argentine Navy. The principal data of these vessels are given in the table below.

The designs of these boats are the result of a most elaborate and laborious examination of plans submitted by more than twenty firms which were invited to tender at the beginning of 1909. The competition was repeated after a first elimination, and at the conclusion of the second examination a

final inquiry was sent out to a restricted number of competitors who tendered for the definite designs adopted.

With regard to gun power the Argentine destroyers are, perhaps, overgunned. They carry four 4-inch 50-caliber pieces, with a magazine capacity of 250 rounds for each. The weight of metal thrown aggregates 132 pounds. The considerable increase of gun power in the latest British destroyers justifies the great importance given to gun mountings in the Argentine vessels. In the *Afridi* type of the *Tribal* class two 12-pounders were added to the original three, thus increasing the weight of metal thrown from 37½ pounds to 62½ pounds, and the types which have succeeded the *Afridi*—the *Amazon*, *Beagle* and *Acorn*—throw 50 pounds, 62½ pounds, and 75 pounds of metal respectively. In the latest foreign torpedo craft designs the tendency is to increase the caliber and length of bore, as the Argentine boats show, and in some navies the possibility of mounting 12 cm. 50-caliber guns (4.7-inch) is now being studied.

Where building.	Length.	Beam.	Depth.	Draft.	Trial displacement.	Six hours' trial speed.	Full equipment displacement.	Full equipment draft.
	ft.	ft. in.	ft. in.	ft. in.	tons.	kts.	tons.	ft. in.
Cammell Laird.....	292.9	27 7	17 1	8 6	980	32	1175	9 10
Krupp (Germania)...	288	27 1	17 1	8 2	935	32	1140	9 6
Nantes.....	289.7	28 2	18 1	8 10	940	32	1170	10 2
Schichau Elbing.....	295.2	29 7	16 5	7 7	885	32	1110	9 2

	Fuel capacity.		Horse-power of turbines.	Number of revolutions.	Boilers.		Steaming radius.
	Coal.	Oil.			Number.	Type.	
	tons.	tons.	H. P.				miles.
Cammell Laird.....	225	75	20,000	600	5	White Forster	3000
Krupp (Germania)...	250	110	19,500	600	5	Schulz	3000
Nantes.....	256	82	19,500	650	5	White Forster	3000
Schichau Elbing.....	290	50	19,500	600	5	Schulz	3000

The Argentine destroyers, like the boats of the *Beagle* and *Acorn* classes, will carry the new 21-inch torpedoes, being fitted with four tubes arranged as shown in the sketch. The new 21-inch Whitehead weapon carries a charge of 150 kilos (331 pounds) gun-cotton, and has speeds of 41 and 29 knots at a range of 2000 meters and 5000 meters respectively.

The great radius of action of the new Argentine turbine destroyers makes of these vessels also very valuable strategical units. With an average of 250 tons of coal and 80 to 100 tons of oil, they will be able to steam practically 3300 to 3500 miles at 14 to 15 knots. The boats are therefore available for service at great distances from home naval bases—Buenos Ayres, La Plata, and Bahia Blanca—and will be able to operate in the South Atlantic as well as in the South Pacific.

The boats are fitted with wireless telegraphy, having a radius of operation of 200 kiloms. Their complement aggregates 110 officers and men.

The system of turbines adopted will be the Curtis impulse type, driving twin-screws. Though the projected motive power varies between 19,000 and 20,000 shaft horse-power, it is expected that the actual full power at the trials will average 22,000 horse-power.—*The Engineer.*

AUSTRIA.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Radetsky	14,500	Trieste.	Under trial.
Erinyi	14,500	"	Launched April 12, 1910.
Erzherzog Franz Ferdinand.	14,500	"	Under trial.
Tegetthoff	19,300	"	Building.
Kaiser Franz Joseph	19,300	"	"

The program of shipbuilding laid before the Austro-Hungarian Delegations by Admiral Count Montecuccoli is admittedly far below the expectations of those who wish to see the maritime strength of the Dual Monarchy placed on a broad and substantial foundation. The aggregate tonnage represented by the program, which is to extend over six years, is hardly greater than the German program for one year. The full details are as follows:

	Kroner.
Four battleships, each displacing circa 20,000 tons. Total inclusive cost	242,400,000
Three cruisers ("*G*," "*H*," "*J*"), each displacing 3500 tons. Total inclusive cost	30,000,000
Six torpedo-gunboats, each displacing 800 tons. Total inclusive cost	18,000,000
Twelve ocean-going destroyers. Total inclusive cost	12,000,000
Six submarines. Total inclusive cost	10,000,000
Grand total	312,000,000

Appropriations will be made each year from 1911 to 1916 inclusive, the amounts for 1912, 1913, and 1914 being the heaviest. Provision is also made for an increase of 800 in the personnel this year.

A most interesting announcement is that the Hungarian yard at Fiume, that of the Danubius-Gesellschaft, is to build one of the four battleships, in addition to six gunboats, as the company has given a pledge to provide all necessary facilities by a given date. In regard to the other three battleships, two are now being built at the Stabilimento Tecnico yards at San Marco, and the third will also be constructed there.

The formation of a Marine Ministry, distinct from the Ministry of War, has evidently been decided upon, as Admiral Count Montecuccoli, who had previously occupied what is known as the "dritte Rangklasse," or third-class rank in the Imperial Councils, has just been appointed to second-class rank, which indicates Ministerial status. As is well known, there is at present no self-contained Austro-Hungarian Admiralty, the administration of the naval service being subordinated to the Kriegsministerium and officially designated the Marine Section. In the year 1862 Archduke Ferdinand Max succeeded in founding an actual Marine Ministry when he was appointed to control the fleet, but after his departure for Mexico the old system was re-established, and has obtained ever since. In the near future, however, the change foreshadowed by the promotion of Admiral Count Montecuccoli will in all probability be made. The Stabilimento Tecnico yard at Trieste has anticipated government requirements by laying down two *Dreadnoughts* at their own risk. The construction of the first ship, the *Kaiser Franz Josef*, was started in April, 1910; and the second, the *Tegetthof*, in September. It is proposed to launch the former in August, 1911, and to have her ready for trials by the autumn of 1913. The second will be launched in February, 1912, and will probably be completed in the spring of 1914. The vessels under construction have a displacement of 19,300 tons, and their machinery of 25,000-horse-power is expected to give them a speed of 22 knots. The primary armament consists of ten

12-inch guns, and the secondary of twenty-four 4.1-inch quick-firing guns. The main armor belt is 11 inches thick, and four submerged torpedo tubes will be fitted.

Austria has at present five modern battleships in commission, and although these are not of *Dreadnought* importance, they are vessels of considerable strength, being well armed and armored, and having good speed. Besides these there are eight battlships of less fighting value (probably of little use against modern big guns), three armored cruisers, six protected cruisers, twelve destroyers, forty-two torpedo-boats, and four submarines. These do not include several vessels nearing completion.—*Naval and Military Record.*

With the close of January some important changes in the constitution of the Austro-Hungarian fleet have been made, notably in the battleship squadron. The battleship *Erzherzog Friedrich*, which has been in constant commission since January, 1907, has been relegated to the First Reserve, and is replaced by the *Radetzky*. By next May or June the various squadrons will be composed as follows:

Active Battle Fleet—*Erzherzog Franz Ferdinand*, *Radetzky*, and *Zrinyi*, 14,500 tons; speed, 20 knots; guns, four 12-inch, eight 9.4-inch. *Erzherzog Ferdinand Max*, 10,600 tons; speed, 20 knots; guns, four 9.4-inch, twelve 7.6-inch. *Kaiser Karl VI*, 6325 tons; speed, 20 knots; guns, two 9.4-inch, eight 6-inch. Two torpedo-gunboats and six destroyers.

First Reserve—*Erzherzog Karl* and *Erzherzog Friedrich*, 10,600 tons; speed, 20 knots; guns, four 9.4-inch, twelve 7.6-inch. *Babenberg*, 830 tons; speed, 19 knots; guns, three 9.4-inch, twelve 6-inch. *Sankt Georg*, 7400 tons; speed, 21 knots; guns, two 9.4-inch, five 7.6-inch. *Maria Theresia* and *Zenta* and three destroyers.

Two battleships, *Arpad* and *Habsburg*, have been withdrawn from the Reserve in order to undergo reconstruction, which may involve a reduction of the secondary battery. In the Second Reserve are the obsolescent battleships, *Wien*, *Monarch*, and *Budapest*, and the cruisers *Kaiser Franz Josef* and *Szigetvar*. The new scout *Admiral Spaun* is attached to the active battle fleet. It is further proposed to create two special torpedo divisions for the defence of the Dalmatian coast. At present there are fifty-four destroyers and boats built or building, with an average speed of 27 knots. To the coastal flotilla will be assigned the depot-ship *Pelikan* and two gunboats.—*Naval and Military Record.*

BRAZIL.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
São Paulo	19,250	Vickers.	Under trial.
Rio de Janeiro	32,000	Elswick.	Ordered.
Scouts.			
Bahia	3,500	Elswick.	Under trial.

THE NAVAL MUTINIES.—The exact inwardness of the Brazilian naval mutinies is not easy to discover. The official view is that they result from trivial causes which can be remedied easily. After the mutiny, however, the demand of the rebels for the abolition of corporal punishment was acceded to, as well as an increase in the strength of the crews, and an amnesty was granted. Now we have the mutinous crew of the cruiser *Rio Grande do Sul*, in association with a battalion of marines stationed in the Cobras Island, bombarding the capital, and herself under fire, one officer and some men being killed, and probably the new ship herself damaged. If the mutinies have a political character, they may be associated with a separatist tendency supported from the South. The unsuccessful revolt of 1893, headed by Admiral Custodio de Mello, and carried to the

bitter end by Admiral Saldanha da Gama, had for its avowed purpose the overthrow of the government of Marshal Peixoto, and not improbably the institution of a separate government in the South. Prominent officers were involved, in which the revolt appears to have differed from recent outbreaks, but time will show whether like objects are not at the root of the trouble.

From these episodes the Brazilians may derive a useful lesson. It is that a fleet does not consist of a couple of battleships fitted from stem to stern and keel to masthead with the latest devices of science, accompanied by a certain number of cruisers and destroyers. It consists still more of patriotic, keen, zealous, and efficient officers, and of disciplined, well-trained men. It is to be feared that the Brazilians have taken too material a view of their naval requirements, and have forgotten that the man is more than the machine. If the real fount of naval efficiency—namely, loyalty to the government—is wanting, there is perhaps nothing more to be said, except that the Brazilian taxpayers have been deceived into the purchase of very expensive equipments which are more likely to be a danger to them than anything else. The discipline of the cabin and ward-room officers, as St. Vincent said, is the discipline of the fleet, and that is where the Brazilian authorities must institute reforms if the new fleet is to be of any use.—*Army and Navy Gazette.*

CHILI.

The efforts now being made by the Chilian government to recover something of its past pre-eminent position among the South American republics as a naval power will be followed with the keenest interest in this country. The Chilians do not forget the services of Cochrane, whose name is still commemorated in a ship of their fleet, while British naval men will always appreciate the achievements of the navy to which he lent his aid, and the gallant way in which its tradition has been upheld by his successors. An interesting reminder of this historic association between Chili and Great Britain was afforded recently by the appointment of Commander Charles Burne, R. N., to the command of the Chilian Naval War College. Captain Burne has been lent by the Admiralty for a period of two years, and he has just left England to take up duty in Chili. It is evident, therefore, that in reorganizing her naval forces, Chili is paying attention to other important details besides the provision of ships. Her naval program includes two battleships, several ocean-going destroyers, and a submarine flotilla, and tenders for the work are to be opened in April.—*Army and Navy Gazette.*

Tenders will be opened in London and Washington on April 5 for two battleships of 25,000 tons, provided with 13-inch guns, for the Chilian Navy.—*Reuter.*

FRANCE.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Danton	18,350	Brest.	Launched July 4, 1909.
Mirabeau	18,350	Lorient.	" Oct. 28, 1909.
Voltaire	18,350	Bordeaux.	Under trial.
Diderot	18,350	St. Nazaire.	Launched Apr. 19, 1909.
Condorcet	18,350	"	Under trial.
Vergniaud	18,350	La Seyne.	Launched Apr. 12, 1910.
Courbet	23,500	Lorient.	Building.
Jean Bart	23,500	Brest	"
Armored Cruisers.			
Waldeck-Rousseau	13,644	Lorient.	Launched Mar. 4, 1908.

The *Moniteur de la Flotte* gives a summary of the progress made by the French Navy in 1910. The two battleships *Jean Bart* and *Courbet* were ordered in October and November. In February two destroyers of 450 tons, *Enseigne Henry* and *Aspirant Herbert*, were put in hand at Rochefort. Private yards have received orders for five destroyers of 750 to 770 tons—*Capitaine Mehl, Dehorter, Francis Garnier, Commandant Bory*, and *Commandant Rivière*. Latterly orders have been given for the destroyers *Bisson* and *Renaudin* at Toulon; *Protet* at Rochefort; and the *Magon, Mangini*, and *Commandant Lucas* in private yards. In addition to these, the submarines *Clorinde* and *Cornélie* have been ordered at Rochefort, and the *Gustave Zédé* at Cherbourg. A salvage dock for submarines has been put in hand at Saint Nazaire. Delay in the delivery of the petrol motors of the *Faraday, Volta*, and *Amiral Bourgeois* caused loss and delay in the construction of these submarines, but some of the time may be recovered. The motors of the *Neuton* and *Montgolfier* are to be delivered in February and March. The delays caused at Rochefort by failure to deliver machinery at the appointed date made it necessary to defer the laying down of the *Protet* until the close of the year.

THE NAVAL YARDS.—In the report on the *Budget* concerning naval matters, which is given in abstract in the *Moniteur de la Flotte*, the question is asked as to whether it is necessary to maintain the six existing French naval yards—Cherbourg, on the Channel; Brest, Lorient, and Rochefort, on the Atlantic; Toulon, on the Mediterranean; and Bizerta, in Tunis. It is remarked that Great Britain has only three large naval yards, and Germany two only. Cherbourg occupies a unique military situation, which renders it an important "center for flotillas." It should be maintained for the construction of small and medium size units exclusively, and for the revictualling of the French fleet. Brest, on the Atlantic, is in quite as favorable a situation as Cherbourg; owing, however, to the size of modern battleships, the space available in the Brest anchorage is barely sufficient. Basins should be excavated outside the river in the roadstead, breakwaters being built as a protection against the heavy swells coming from the ocean, and large docks provided; work, for increasing the facilities at Brest, should be commenced immediately on an adequate scale, this being cheaper in the end than piecemeal operations. The question as to whether Brest arsenal should be fitted up to build large units, or, as Toulon, maintained for carrying out repairs only, is disputed. Some authorities state that when a building-yard and repair-shops are in too close proximity new constructions are much too long on the stocks, since men are constantly being taken from new work to carry out repairs; others ask that there be a large amount of labor available for distribution, both on repair work and new work, this being the best means for keeping the various gangs occupied, and for utilizing the docks and basins, thus reducing general expenses. Lorient can no longer be considered a military harbor; no further funds should be expended upon it for facilitating the entrance and egress of large units. It should remain a shipyard, the hulls built at Lorient being towed to Brest for fitting out. The remarks concerning Lorient apply with more force to Rochefort; this might, however, remain a revictualling center. Toulon is indispensable to the fleet; its importance from the military point of view is acknowledged. It appears undesirable to the reporter on the *Budget* to contemplate building at Toulon large units for the fleet; the yard, moreover, finds sufficient employment in repair work. The roadstead, however, requires deepening, and the docks and basins require enlarging. Bizerta, as an arsenal, was satisfactory from the commencement, but part of the works have been erected at a distance, outside the fortified portion, so as to shelter them from the firing of an enemy lying in the Mediterranean. The report concludes by suggesting the maintenance of Brest and Toulon as military harbors, Cherbourg and Bizerta forming two naval yards; Lorient could for the present be maintained as it now stands; Rochefort

should be done away with, the small units being built exclusively at Cherbourg and Toulon. We should have liked to find in the report in question a reference to the French private shipbuilding yards which are distributed round the coast, and are fully able to build and equip the largest units under reasonable conditions as regards time and cost.—*Engineering.*

WORLD'S LARGEST SUBMARINE.—The *Mariotte*, the largest submarine in the world, having a displacement of 1100 tons, was successfully launched at Cherbourg on Feb. 7.

The displacement of the *D* class of submarines in the British Navy is 604 tons.

Experiments in wireless telephony, which have been carried out by the French battleships *Justice* and *Verité*, have given excellent results. It was found that conversation could easily be heard at a distance of 72 miles.

NEW DRY DOCKS.—Two ports on the western coast of France have each recently completed a large dry dock. These ports are St. Nazaire and Bordeaux. Each of these docks is large enough to accommodate any French warship either existing or to be built in the near future, and the former will be able to receive any vessels of the mercantile marine which, as far as can be foreseen, are likely to be constructed in France for some time to come.

It was certainly high time that a dry dock of reasonable size was provided at St. Nazaire. The battleships *Diderot* and *Condorcet*, which were launched last year at that port, lay until the new dock was ready with some of their launching gear adhering to their hulls simply because there was no dock which would take them in. The work of construction was finally taken in hand by the St. Nazaire Chamber of Commerce, acting in conjunction with the two leading shipyards of the district, Les Ateliers et Chantiers de la Loire and Les Chantiers de l'Atlantique, and carried to a successful conclusion, each bearing a share of the cost. This action is worthy of notice, as it is quite contrary to French customs as a rule to carry out such work by private enterprise and without the assistance of the State.

The main dimensions of the dock are:

	Feet.
Total length	757.7
Length available for use	738.0
Maximum width at entrance	114.83
Width on floor at entrance	98.43
Maximum width of dock, including platform	125.33
" " " " excluding "	114.83
Width of dock on floor	104.99
Minimum depth over sill at low water	24.48
Depth over sill at ordinary high water	28.87
Maximum depth over sill at equinox	30.19

The dock at Bordeaux is due to the Gironde Works, which are at Lorient on the Garonne at some distance from the harbor and even more exposed than it to strong currents and heavy tides. In order to cope with this difficulty all vessels built by this firm have, till quite recently, been launched with engines in place and boilers under steam. The dimensions of the vessels have, however, increased so rapidly that the weights to be manipulated have become excessive. *La Verité*, for example, had a launching weight of 12,000 tons. Moreover, it became increasingly difficult to get the heavy weights necessitated by the introduction of modern high-powered engines into the boats. In the case of the last warship built, the turbines were of 22,500 horse-power, and it was found impracticable to get them into position while the vessel was on the stocks. Accordingly this

method has now been abandoned in all cases. It was at first proposed to make a floating dock protected from the action of the currents by some system of baffles. It was, however, found that suitable land was available and that the cost of constructing a dry dock on shore would not be very much in excess of that of the floating dock. The dry dock was accordingly built and it has the following dimensions:

Total available length	594 ft.
Width at quay level	121 ft. 5 in.
Width at entrance	108 ft. 3 in.
Depth of water with a 16 ft. 5 in. tide	32 ft. 10 in.

It may be added that the dimensions of two 23-000-ton battleships which are to be laid down at the Gironde Works are: Length, 542 feet, extreme beam 88 feet, and draft 29 feet 6 inches, so that they will easily be accommodated in the new dock.—*The Engineer.*

TRAINING FOR HIGH COMMAND.—The *France Militaire* develops some conclusions on the subject of the "Centre des Hautes Etudes Militaires," which began its operations on Jan. 15. This seat of learning and instruction, which is to exercise higher duties than the Ecole de Guerre, owes its origin to the personal influence of Gen. Brun, Minister of War, and the object is to prepare selected officers for higher staff duties and command. The first result will be to facilitate the choice of officers for important appointments. It gives to the Minister a great and necessary privilege, but it also imposes upon him the gravest responsibility. In view of this he has thought it wise to surround his preferences with proper guarantees based upon intellectual and physical tests. But the Minister had another idea. Making the Army staff and the Superior Council of War share in the duties, he hopes to see these organizations actually at work. The staff of the Army, which is the brain of the military organizations, had confided to it the "production" of the new course of high studies. A new function has been provided for the staff, and the general will have it under close observation. The *France Militaire* holds the view that the new organization provides a veritable school, in the most elevated sense of the word, for the high command.—*Army and Navy Gazette.*

ARMAMENT OF FUTURE BATTLESHIPS.—On Jan. 16, a meeting was held under the presidency of the Minister of Marine of the Conseil Superieur, comprising, in addition to the four inspectors of the fleet, Admirals de Jonquières and Jaurêguiberry, as well as the head of the Ordnance Department. The question of the armament of future cuirassés was put on the tapis, and the discussion is said to have been highly animated and interesting, as will be readily understood when it is known that the Council was confronted with most momentous proposals, viz., the discarding of the *Courbet* type of battleship, and of the tried and now thoroughly efficient 305-mm. weapon, together with the abandonment of the powerful axial fire, traditional in the Gallic Navy, in favor of the center line of turrets as adopted in the British and American Navies. The distinguished members were asked to take into consideration the following facts, viz.:

1. Superior quality was the only way to make up for the numerical deficiency of the French fleet.

2. Superior gun-power consists of the superior destructive power of the guns, combined with sufficient rate of fire.

3. Excellent as are the latest 305-mm. designs, there cannot exist too much margin of penetration, too much exploding capacity in the shells, with the long-range contests of to-morrow and the ever-improving quality of modern armor.

4. To strike hard and to force on decisive and immediate results is the best, most economical, and most "truly military" way of fighting.

5. The great difference in the rate of fire which existed between the very heavy ordnance (340, 370, and 420 mm.) of 25 years ago, and the medium-sized guns of the same period has been considerably reduced by the progress of mechanical science, and the new 340-mm. weapon, prepared by the Direction d'Artillerie, will fire nearly as fast as the 305-mm. of the *Dantons* a shell far heavier (nearly 600 kilos) and containing a greater quantity of melinite.

6. An increase in the caliber of the heavy guns was the only means, really effective and economical, to add to the power of a 12-turreted ship like the *Courbet*—although triple 12-inch turrets might be advocated.

7. It can never be wise policy to run encounter to the trend of progress, and the French Navy would obviously be courting dangerous inferiority towards her perspective rivals by sticking to the 305-mm. weapon.

8. The American and English system of center-line turrets—which the French marine applied 27 years since in her *Baudin* and *Formidable*—presents the greatest number of advantages (especially with very heavy guns) both from the military and constructional standpoints. The practical (and total) arc of fire is greater in the U. S. *Arkansas* than in the *Courbet*, whilst on the other hand axial fire need not be sacrificed since the extreme turrets are at different levels and may be made (at least the lowest) to contain 3 guns instead of 2.

9. The disposition of the amidship turrets in echelon, like in the British *Neptune* and in the Argentine new ships, is not without drawbacks from a constructional point of view, and, moreover, it does not permit, so well as the center-line of turrets, to concentrate the whole of the heavy armament on an enemy.

10. The discarding of the *Courbet* type will entail no delay in the construction of the future cuirassés, the active and able Constructor Lyasse having prepared designs (24,000 and 25,700 tons) embodying the desired change in the caliber (a) 5 twin 340-mm. turrets, (b) 2 triple 340-mm. turrets and 3 twin turrets.

11. As to the small armament, the 140-mm. weapon, which allows easy handling, quick loading and firing, is generally judged with its 80-pound shell to answer all requirements. The only question to be decided upon is as to the advisability to replace the twenty-two 140-mm. guns in four redoubts, as in the *Courbet*, by sixteen similar weapons in eight thickly armored twin turrets on the upper deck, this reduction in number being compensated by greater command and arc of fire, and on the whole by better utilization.

No definite decision, it is understood, was arrived at, though Admiral de Lapeyrère is credited with the firm intention to carry out his own views and to see that the service, of which he has charge, benefits to the full with the progress of naval science. A compromise is possible in the case of the two ships of the 1911 program.

Despite the delay which will take place in the discussion of the Lapeyrère naval program, no doubt is now entertained in political circles that this important naval law will be voted in the spring and, for some time at least, impart some sorely needed stability to the policy of the Rue Royale. Mons. Delcassé, the much-respected statesman who has rendered immense service to the "marine française," in bringing about the retirement of the incompetent previous civilian Ministers, is employing the influence which he enjoys among all parties in the Chamber, in favor of the projected program, which he caused last week to be endorsed officially by the "gauche radicale" party, which is the dominant factor in parliamentary votes. On the other hand, the "groupe des interêts maritimes," which comprises 150 members, has also given its complete and unreserved support to the "organic law." There is in these significant manifestations a sign that the vital importance of sea-power begins to be realized in the French Chamber.

Putting aside the systematic—and futile—opposition of the Socialists, the Lapeyrère naval program is certain to be criticised as erring on the

side of moderation. At the same time, it is unjust to say that the program takes no account of the superior financial resources of the Republic. It represents a gradual, well-sustained, and permanent effort, without strain upon the finances of the country, whilst the German and Italo-Austrian armaments are fundamentally spasmodic and ephemeral, being supported by borrowed money, by abnormal and exceptional means.—*Naval and Military Record.*

GERMANY.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Ost Friesland	19,000	Wilhelmshaven.	Launched Sept. 30, 1909.
Thüringen	19,000	Bremen (Weser Yard).	" Nov. 27, 1909.
Helgoland	19,000	Kiel (Howaldt).	" Sept. 28, 1909.
Oldenburg	19,000	Danzig (Schichau).	" June 30, 1910.
Ersatz Hildebrand	20,000	Kiel (Kaiserliche W.).	Building.
" Heimdall	20,000	Hamburg (Vulkan).	"
" Hagen	20,000	Kiel (Howaldt).	"
" Aegir	20,000	Danzig (Schichau).	"
" Odin	21,000?	Wilhelmshaven.	"
" K. Friedrich Wilhelm			Authorized.
" Weissenburg			"
" S			"
Armored Cruisers.			
Moltke	21,500?	Hamburg (Blohm and Voss).	Launched April 7, 1910.
H	21,500?	Do.	Building
J	21,500?	Do.	"
K			Authorized.
Protected Cruisers.			
Kolberg	4,300	Danzig.	Under trial.
Koeln	4,350	Kiel.	" "
Augsburg	4,350	"	" "
Ersatz Bussard	4,500 ?	Stettin (Vulkan).	Building.
" Falke	4,500 ?	Bremen (Weser).	"
" Cormoran	4,500 ?	Bremen (Weser).	Ordered.
" Condor	4,500 ?	Wilhelmshaven.	"
" Seeadler			Authorized.
" Geier			"

THE 1911 ESTIMATES.—The German Navy estimates for 1911 amount to a total of £22,527,888, including recurring expenditure on ordinary charges of £8,360,624 (an increase of £493,916), non-recurring ordinary expenditure of £13,200,141 (increase £371,727), and extraordinary expenditure of £966,995. The sum to be raised by loan is £4,486,000. It should be observed that the naval outlay of Germany, vast as it is, has never reached the amounts contemplated in the financial scheme of the Navy Law of 1908. Thus the scheme contemplated in 1910 an expenditure of £21,940,000, of which £6,250,000 would be raised by loan, while the actual demand was about £600,000 less and the amount met out of loans was £5,550,000. In 1911 there would be a total of £23,085,000, including £6,225,000 to come out of loans. It will be seen that the actual estimates are more than half a million below the sum contemplated as possible in the scheme, while the amount to be raised by loan is very considerably less. The votes for ship-building and armaments, which attract chief attention, amount to £12,513,650, being an increase of £331,150, under the following heads: New con-

struction, £7,960,000 (increase £240,500); ordnance, £3,862,000 (increase £70,000); torpedo armaments, £478,500 (increase £24,500); and mining requirements, £82,650 (increase £32,650); while the sum asked for repairs is £125,000, being a decrease of £36,500. Provision is made in greater or lesser degree for 16 battleships and battle-cruisers belonging to the programs of four successive years. The completion of the *Ostfriesland, Helgoland, Thuringen,* and *Moltke* is the first item. These ships were said by Mr. McKenna to have been expedited for completion in 1910, but they are down for completion in the spring and summer of 1911, the new estimates containing the final charges. The third instalments are included for the ships of 1909—*Oldenburg, Ersatz Heimdall,* and *Ersatz Hildebrand,* and the battle-cruiser *H*. But the sums demanded are £500,000 less than those in the estimates of 1910. Nor should it be forgotten that the *Oldenburg* and *H* were said to have been accelerated. The new estimates also include the second votes for the *Ersatz Hagen, Ersatz Aegir, Ersatz Odin,* and the battle-cruiser, which have just been laid down and are to be completed in 1913. The new construction to be provided for in 1911 is three battleships and one battle-cruiser in addition to the customary two "small" cruisers and the division of 12 destroyers.

In criticism of the estimates Capt. von Pustau, a retired naval officer, points out in *The Tägliche Rundschau* that the annual expenditure for the navy has increased from £9,750,000 in 1901 to £22,500,000 in the year 1911, and that the total sum expended on the fleet until the end of the financial year 1911 is £161,000,000—that is to say, £1,700,000 less than originally calculated. He notes further that the estimated expenditure for the coming financial year is £825,000 more than in the previous year, or considerably less than originally contemplated.

Most of the increase, Capt. von Pustau remarks, is required for the 159 officers and 3264 men added to the personnel of the navy, which will now number 60,580.

The High Seas fleet will consist of 17 battleships and two reserve battleships, four large and six small cruisers, and torpedo-boats.

Foreign stations are occupied as follows: Eastern Asia: Two large and three small cruisers, four gun-boats, two torpedo-boats, and three river gun-boats. Australia, West Africa, and East Africa: Each two small cruisers. America: One small cruiser.

First instalments are demanded in the new estimates for three battleships, namely, the *Ersatz Kurfürst Friedrich Wilhelm, Weissenburg,* and *S*. When the last-named vessel is ready the German Navy will consist numerically of the 38 battleships provided for in the Navy Acts, but, as Capt. von Pustau remarks, among these 38 vessels are the absolutely antiquated *Brandenburg* and *Wörth,* and five ships of the *Kaiser* class are included. The first instalment is also demanded for one large cruiser, which, when ready, will nominally complete this class. Capt. von Pustau remarks, however, that among the twenty vessels of this class are included vessels so inferior from the fighting point of view as the *Kaiserin Augusta* and five training ships of the *Hertha* class.—*Naval and Military Record.*

The naval estimates for 1911 include $375,000 for target practice (an increase of $50,000 over 1910) and $150,000 for ordnance experiments.

In a short survey of the past year, *Ueberall* remarks that the technical advances and the lessons of the Russo-Japanese War have been closely observed with reference to the armament and fitting of the new German ships. "Whether a heavier—as a 12-inch—gun will be introduced has not yet been decided; the medium armament will be retained." The new ships have turbines, with which engines excellent results have been attained, and the small cruiser *Emden* has been as successful as the *Von der Tann*. At Wilhelmshaven an important turbine shop is to be built. Trials with motor

engines for the navy are in progress. The harbor, fortress, and protective works at Helgoland are making progress. The new naval school at Mürwik and the high school at Tsingtau have been opened. The last vessel of the navy carrying the old masts and yards, the *Nixe*, went out of commission in May.

PERSONNEL.—If the ship-building program embodied in the German Navy estimates brought no surprises, being merely the execution of the program provided by the Navy Law, there is no reason to be surprised by the increases which are being made in the *personnel*. It was a great merit of the Navy Law that it prescribed an expansion in the number of officers and men in correspondence with the increase of the fleet. Everything is strictly ordered and methodical. The additions to be made in the course of the year are 1 vice-admiral, 4 captains, 2 commanders, 8 corvette captains, 24 captain-lieutenants, and 56 lieutenants and sub-lieutenants. To the engineer branch 20 officers of various ranks are intended to be added. Unfortunately, there is a decline in the eagerness to enter this branch of the service, which is generally attributed to the widening social breach between the executive and engineer branches of the German Navy. Promotion and prospects in the navy are now good, and wealthy and noble families are sending their sons into the service instead of into the army, with unfortunate results for the engineers. There are additions (13) to the medical branch. The men of the lower deck are being increased by 2910, including 554 higher ratings, and the seamen-gunners are being increased by 264.—*Army and Navy Gazette.*

TORPEDOES AND TORPEDO NETS.—The Marine Office, after much experiment and hesitation, has commenced to equip all battleships and large cruisers with torpedo nets. For many years German technicians were opposed to net defence for reasons that have never been fully ventilated. They pinned their faith to a clever invention of the net-cutting type, of which six varieties exist in Germany alone, but the great advantages conferred by the net have finally won the day. An improved torpedo is also under consideration. The largest torpedo now used in the German Navy has a diameter of 19½ inches, and a maximum range of 4200 yards, this distance being run at a speed of 21 knots, so that the weapon does not compare so very unfavorably with the British 21-inch model, but the new German torpedo, according to report, will be much more speedy and powerful. The diameter approximates 22 inches, and the charge is about 300 pounds, whilst the maximum range is given as over 5000 yards. All the destroyers to be built this year will, I understand, be armed with the new torpedo, though this is not yet confirmed, and the torpedo armament of the new battleships will doubtless show the same improvement. It may here be remarked that the submerged training tubes experimentally introduced some years ago are about to be replaced by fixed tubes, as the first-named have proved impracticable and more expensive.—*Naval and Military Record.*

WARSHIPS IN GERMAN HARBORS.—*Treatment of Foreign Vessels.*—The following is a translation of the revised regulations on the above subject appearing in the *Marine Verordnungsblatt:*

1. Warships and war vessels of foreign powers need no special permission to enter fortified and unfortified German harbors and river mouths, or to navigate on inland waters. Suitable notice should, however, be given of such visits through diplomatic channels.

Without this, foreign warships and war vessels, with the exception of the cases given in section 2, may neither cross the extreme line of fortification, nor remain in the roadstead nor in the harbor respectively in river

mouths and inland waters. For use of the Kaiser Wilhelm Canal see section 3.

The number of warships and war vessels of the same foreign nation allowed to remain at the same time in a fortified or unfortified harbor is, as a rule, limited to three. Exceptions require permission obtained through diplomatic channels.

2. The above regulations do not apply—(a) to ships and vessels having on board Sovereigns, members of the Sovereign's family, Presidents of Republics or their suites, or Ambassadors or Envoys to the Court of H. I. M. the Emperor; (b) to ships and vessels which are obliged by perils of the sea or damage to run into a German harbor, etc.

3. Permission should previously be applied for through diplomatic channels for foreign warships and war vessels to pass through the Kaiser Wilhelm Canal.

4. In fortified or garrisoned harbors, not the headquarters of a Naval Commander-in-Chief of a station, the chief pilot (Lotsenkommandeur) or harbormaster shall without delay acquaint the commandant (senior officer of the garrison) of the approach and entry of a foreign warship or war vessel.

Commandants (senior officers of garrisons) shall immediately inform by telegraph the General Commanding, the Naval Commander-in-Chief of the North Sea or Baltic station, the Admiral Staff of the Navy and the Reichs-Marineamt, of the arrival of foreign warships or war vessels.

In Kiel and Wilhelmshaven the two last-named authorities will be informed through the Commander-in-Chief of the station.

In ports not garrisoned the police authorities are to acquaint the authorities mentioned in paragraph 3 of this section of the arrival of foreign warships or war vessels.—*Naval and Military Record.*

The Budget Committee of the Reichstag has passed the extraordinary navy estimates for new vessels without debate. The chairman pointed out that with the laying down of the ironclads and the big cruiser *K* all the vessels composing increase in the navy included in the enactment fixing the Government naval program were now in hand.—*Reuter.*

NORTH SEA STRATEGY.—German service journals profess surprise that so much exception should have been taken in England to the article on the North Sea and its strategical character, which appeared in the January *Marine Rundschau.* The *Deutsche Tageszeitung,* after printing copious extracts from the article, and insisting on its technical and scientific character, attacks *The Naval and Military Record* for having presumed to express regret at its publication. However much opinions may differ as to the tendencious nature of the *Rundschau* article, the fact remains that its appearance seems to have been the signal for a perfect deluge of other articles, all of which seek to drive home with sledge-hammer force the points advanced by the Admiralty organ. Journals of high repute, which have hitherto displayed some moderation and tact in discussing the Anglo-German question, have thrown in their lot unreservedly with the extremists. It will surprise people who know the standing of the journal to learn that the *Frankfurter Zeitung* gives prominence to a lengthy discussion by Lieut.-Col. Rogalla von Biberstein of the ease with which the Baltic Sea could be held against English *Dreadnoughts.* This writer believes that England would commence a campaign against Germany by seizing some point on the Danish coast as a point d'appui, and he therefore sounds a note of warning to Denmark. The *Rundschau* article, it will be recalled, credited England with the same intention of exploiting neutral nations in case of war.—*Naval and Military Record.*

GREAT BRITAIN.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Colossus	20,250	Scotts (Greenock).	Under trial.
Hercules	20,250	Palmer's (Jarrow).	" "
Orion	22,500	Portsmouth.	Launched Aug. 20, 1910.
Monarch	22,500	Armstrong.	Building.
Conqueror	22,500	Beardmore.	"
Thunderer	22,500	London (Thames Iron Works).	Launched Feb. 1, 1911.
Ajax	23,500	Scotts (Greenock).	Building.
Audacious	23,500	Cammell, Laird & Co.	"
Centurion	23,500	Devonport.	"
King George V	23,500	Portsmouth	"
Armored Cruisers.			
Lion	26,350	Devonport.	Launched Aug. 6, 1910.
Princess Royal	26,350	Vickers.	Building.
Australia	18,800	Brown & Co.	"
New Zealand	18,800	Fairfield.	"
	26,850	Palmer (Jarrow).	"
Cruisers.			
Blonde	3,400	Pembroke.	Under trial.
Active	3,400	"	Building.
Amphion	3,400	"	"
Dartmouth	5,250	Vickers.	"
Falmouth	5,250	Beardmore.	Launched Sept. 20, 1910.
Weymouth	5,250	Armstrong.	" Nov. 18, 1910.
Yarmouth	5,250	London & Glasgow Co.	Building.
Southampton	5,250	Brown & Co.	"
Dublin	5,250	Beardmore.	"
Sydney	5,250	London & Glasgow Co.	"
Chatham	5,250	Chatham.	"
Melbourne	5,250	Cammell, Laird & Co.	"

NEW CONSTRUCTIONS.—The Admiralty have placed the contract for the battleship-cruiser included in this year's navy program with the Palmers Iron and Shipbuilding Company, of Jarrow-on-Tyne, and the turbine machinery will be manufactured by the Wallsend Slipway and Engineering Company. This cruiser belongs to the same class as the *Lion* and the *Princess Royal*. The arrangement of this contract completes the list of orders for the ships of the program for the current financial year, and it may be interesting to give a complete record of the builders of hulls and engines of this large fleet of new vessels. The battleships will be improved *Orions*. In the table appended the two cruisers and three torpedo-boat destroyers for the Australian fleet are each marked with an asterisk:

Battleships:	*Builders.*	*Engineers.*
King George V	Portsmouth Dockyard	Parsons Company
Centurion	Devonport Dockyard	Hawthorn, Leslie & Co., Newcastle
Ajax	Scotts Company, Ltd., Greenock	Scotts Company, Ltd., Greenock
Audacious	Cammell Laird & Co., Ltd., Birkenhead	Cammell Laird & Co., Ltd.
Battleship-Cruiser:		
—	Palmers Company, Ltd., Jarrow	Wallsend Slipway and Engineering Co., Ltd., Wallsend

Unarmored Cruisers:		
Chatham	Chatham Dockyard	Thames Iron Works, London
Dublin	W. Beardmore & Co., Ltd., Dalmuir	Beardmore, Dalmuir
Southampton	J. Brown & Co., Ltd., Clydebank	Brown, Clydebank
Sydney*	London and Glasgow Company, Glasgow	L. & G. Company, Glasgow
Melbourne*	Cammell Laird & Co.	Cammell Laird & Co.
Amphion	Pembroke Dockyard	Hawthorn, Leslie & Co., Ltd.
—	Pembroke Dockyard	Hawthorn, Leslie & Co., Ltd.
Torpedo-Boat Detsroyers:		
Three	J. Brown & Co., Ltd., Clydebank	J. Brown, Clydebank
Two	J. S. White & Co., Ltd., Cowes	White, Cowes
Two	Cammell Laird & Co., Ltd., Birkenhead	Cammell Laird & Co.
Two	Hawthorn, Leslie & Co., Newcastle	Hawthorn, Leslie & Co.
Two	W. Denny & Bros., Dumbarton	Denny & Co., Dumbarton
One	Vickers Co., Barrow-in-Furness	Vickers Co.
One	W. Beardmore & Co., Ltd., Dalmuir	W. Beardmore & Co.
One	Swan, Hunter & Wigham Richardson, Ltd., Wallsend	Wallsend Co., Wallsend
Two†	W. Denny & Bros., Dumbarton	Parsons Co., Wallsend
Two†	J. L. Thornycroft & Co., Ltd., Southampton	Thornycroft
Two†	Yarrow & Co., Ltd., Glasgow	Yarrow
Three*	Yarrow & Co., Ltd., Glasgow	Yarrow
Submarine Boats:		
Two	Chatham Dockyard	Chatham Dockyard
Five	Vickers Co., Barrow-in-Furness	Vickers Co.
Submarine Depot Ship	Scotts' Company, Greenock	Scotts' Company
Two Submarine Tenders	Cammell Laird	Cammell Laird
Salvage and Tank Vessel	Vickers Company, Barrow	Vickers Co.
Coastguard Cruiser	Hall, Russell & Co., Aberdeen	Hall, Russell & Co.
Floating Dock	Cammell Laird & Co., Ltd.	—
Floating Dock	Swan, Hunter & Wigham Richardson	—

The fourteen destroyers first enumerated are all of the same design, by Sir Philip Watts; this also applies to the three vessels for the Colonies; but the other six, and marked with a † in our list, ordered in pairs, from Parsons, Thornycroft & Yarrow, are of special design, with alternative systems of machinery, which will invest their trials with great importance. —*Engineering.*

THE KING GEORGE V CLASS.—In continuance of the policy which has been observed for some years, no particulars of the *Centurion* and her three sister ships will be made known officially. It may, however, be stated that they will approximately have a length of 564 feet between perpendiculars (600 feet over all), and a beam of 89 feet, on a displacement of between 23,000 and 24,000 tons. The main armament of ten 13.5-inch guns will correspond with that of the four *Orions*, of 22,500 tons displacement, now building, the guns being disposed along the center line. This arrangement will give a bow and stern fire of four guns, and a broadside of ten. The caliber of the auxiliary armament is doubtful, but it is understood that the design provides for a new system of grouping, and also for the secondary gun positions to be well protected with armor. The torpedo tubes will be of the new 21-inch diameter, and the ships will have an exceptionally powerful searchlight equipment.

The vessels will have a stern walk, and their construction will mark a return to the very old custom in the British Navy of placing the officers' quarters in the after part of the ship. So far as modern ships are concerned, at any rate, the original *Dreadnought* was the first vessel in which the officers' quarters were located forward. The innovation was never popular, and apparently it has not been justified by experience.

On 23,500 tons the *King George V* class will be 5600 tons bigger than the *Dreadnought*. How consistent the advance in size of our *Dreadnoughts* has been is shown in the following table:

Program.	Ship.	Length (feet).	Beam (feet).	Tonnage.	Horse-power.
1905	Dreadnought	490	82	17,900	23,000
1906	Bellerophon	490	82	18,600	23,000
1907	St. Vincent	500	84	19,250	24,500
1908	Neptune	510	85	19,900	25,000
1909	Orion	545	88½	22,680	27,000
1910	King George V...	560	89-90	23,500	31,000

The *Neptune*, which was built very economically cost £86 8s. for each of her 19,900 tons. If the *King George* is built as cheaply, ton for ton, the bill will make a noticeable hole in the third million, for this tonnage rate works out to £2,039,800 for the ship.—*Naval and Military Record.*

The secondary armament of the *King George V* class will consist of twenty 4-inch guns, which, it is understood, will be mounted on the main deck behind armor. This was one of the most severely criticised features of the U. S. *Delaware-North Dakota* class, and it is interesting to see the British and other naval powers now adopting it.

The placing of the contract for the new armored cruiser of the *Lion* class with Palmers Shipbuilding Company, of Jarrow, and the announcement that she is to be fitted with turbines seem to dispose finally of the statement that one of the new capital ships provided for in the last navy estimates is to have internal combustion engines driven by petrol.

The new cruiser will have an over-all length of 725 feet and an extreme

beam of 87 feet. It is expected that she will attain a speed of 28 knots, developing 75,000 horse-power, as compared with 70,000 horse-power of the *Lion*, and that she will be called *Queen Mary*.

ANTI-TORPEDO ARMAMENTS.—We are very glad to see it announced that the Admiralty intend to place the guns carried by our battleships and cruisers to beat off the attack of surface and submarine torpedo craft, behind armor. A commanding position has generally been given to the light guns used against torpedo craft, and in recent years the shields intended at one time for the protection of the guns' crews against machine-gun fire have been stripped off and cast on the scrap-heap as useless lumber, since these light guns were never manned in a ship prepared for battle and the torpedo craft do not hit back and disclose their whereabouts by gun fire when they are rushing in to attack. But what is needed in these days of destructive shell fire from the larger nature of an enemy's gun is some protection from the fragments of explosive projectiles which wreck everything that is exposed in the vicinity of their point of explosion. Our rivals have for a long time been placing armor around the positions in which their anti-torpedo guns are mounted, and have thus afforded them the needful protection to their bores and mechanism. This plan is now to be followed in the ships being laid down at our shipbuilding yards. The same size of gun will be mounted, but they will be brought nearer the water-line, which is a sacrifice in so far as they will lose their old "command," but the sacrifice is called for to gain other advantages and must be made.—*United Service Gazette.*

THE NEPTUNE.—The *Neptune*, the largest battleship afloat in European waters, has been commissioned at Portsmouth, Captain C. M. de Bartolome hoisting his pennant. She is the eighth battleship of the *Dreadnought* class to pass into the service. She has a displacement of 19,900 tons, is 510 feet long, and 85 feet in the beam. She was laid down at Portsmouth on January 19, 1909, under the 1908-9 naval program, and has therefore taken a week less than two years to build. She carries an armament of ten 12-inch 50-caliber guns, sixteen 4-inch 31-pounder quickfirers for defence against hostile torpedo craft, and three 21-inch torpedo-tubes of the new type. In the arrangement of her principal guns the *Neptune* differs from all previous British *Dreadnoughts*. Instead of being abreast, her two beam turrets are disposed *en échelon*, which enables both of them to fire on either broadside. Astern there is another change, for instead of both turrets (on the center-line) being on the same level, the one further from the stern is raised, so that its guns fire over the aftermost turret.

She will, in April next, replace the *Dreadnought* as flagship of the home fleet, and in the interval will carry out a number of experimental cruises, and, it is anticipated, pay a visit to the Mediterranean, as did the first *Dreadnought*. The *Neptune's* crew is composed of the nucleus crew of the battleship *Illustrious*, and of ratings drawn from naval barracks, each of whom marched aboard on the morning of the commissioning of the vessel. The turbine engines of 25,000 horse-power with which the *Neptune* is equipped, are the work of Messrs. Harland and Wolff, the famous Belfast shipbuilders and engineers. The *Neptune* is the first *Dreadnought* to be equipped with the new 21-inch torpedo, the compressed air actuating which is heated, and which gives an initial speed of 40 knots, and an effective range of seven miles, compared with the four-mile range of the 18-inch torpedo. She has been completed at a cost considerably below the estimated achievement—of which fact the Portsmouth dockyard authorities are naturally very proud—and also completed within the stipulated two years with scarcely any overtime.

Taken in conjunction with her more effective guns, the *Neptune* is considerably more powerful than the *Dreadnought*, as the following table will show:

	Ahead.	Astern.	Broadside.
12-inch guns:			
Dreadnought	6	6	6
Neptune	6	8	10
Muzzle energy (foot tons):			
Dreadnought	286,200	286,200	381,600
Neptune	320,400	427,200	534,600

Carrying the comparison still further, the following tabulated statement is, to say the least of it, instructive:

	Dreadnought.	Neptune.
Length over all	526 ft.	546 ft.
Breadth (extreme)	82 ft.	85 ft.
Draft (mean)	26½ ft.	27 ft.
Displacement	17,900	19,900
Designed shaft h. p.	23,500	25,000
Designed speed	21 knots.	21 knots.
Armor belt	11 in.	12 in.
Armament (main)	10 12-in. (45c.)	10 12-in. (50c.)
	24 12-pdr.	16 4-in.
Torpedo tubes	3 18-in.	3 21-in.
Broadside fire	6,800 lbs.	8,500 lbs.
Cost (total)	£1,813,100	£1,728,429
Cost (per ton)	£101.2	£86.8

It may be pointed out that in our later ships, such as the *Orion* and the *Lion*, all the turrets are being placed on the center-line; so that, while the full armament remains available for broadside fighting, the number (compared with the *Neptune*), bearing ahead, is reduced from six to four and astern from eight to four. It is the difference in the broadside fire that marks such a distinct increase in the *Neptune's* offensive qualities compared with the other types of the all-big-gun ship. In the matter of the projectile, too, although the weight of that fired by the *Dreadnought's* guns is the same as that of the *Neptune*, yet the muzzle velocity and consequent striking power of the 50-caliber gun of the latter is considerably of greater energy than the 45-caliber gun of the latter. Not only this, but the main-armor belt is strengthened and made heavier, corresponding with the increase in gun-power and adding greater resisting-power to an enemy's guns.—*United Service Gazette.*

THE "INDEFATIGABLE."—The *Indefatigable*, the fourth British armored cruiser of *Invincible* type, was commissioned on February 24. The date of the *Indefatigable's* commissioning was also that on which Rear-Admiral the Hon. Stanley Colville completed his time in command of the First Cruiser squadron, and was succeeded by Rear-Admiral Lewis Bayly, from the command of the Royal Naval War College. This officer will have under his command four "battle cruisers" of the all-big-gun type, in addition to the *Defence*, of the *Minotaur* class, which, it is announced, will be recommissioned on February 14, for further service in the First Cruiser squadron. Rear-Admiral Lewis Bayly will, therefore, be at the head of the most powerful cruiser squadron in the world, the tonnage and gun power embodied in his command being as follows:

	Displacement (Tons).	Best known speed. (Knots).	Main armament.
Invincible	17,250	28.6	8 12-in.
Inflexible	17,250	28.4	8 12-in.
Indomitable	17,250	28.7	8 12-in.
Indefatigable	18,750	...	8 12-in.
Defence	14,600	23.4	4 9.2-in. 10 7.5-in.

In addition, the *I's* carry sixteen 4-in. quick-firing and five machine guns, and the *Defence* has sixteen 3-inch quick-firing and five machine guns. All the vessels are also fitted with five torpedo-tubes except the *Indefatigable*, which has only two. The *Indefatigable* on her recent speed trials developed about 28 knots per hour.

The *Indefatigable* is the first British ship of *Dreadnought* or *Invincible* type, whose torpedo defence guns are not carried on the upper deck or on the turret tops.—*Naval and Military Record.*

THE THUNDERER.—The battleship *Thunderer*, which was launched on Feb. 1, from the yard of the Thames Ironworks Company, is the twelfth British battleship of the *Dreadnought* type to enter the water. The *Thunderer*, however, resembles the *Dreadnought* in nothing save speed and the single-caliber main armament. In other respects the vessel about to be launched will be nearly 5000 tons heavier than the *Dreadnought*, as well as 58 feet longer; her guns will be 13 5-inch caliber, as against 12-inch, firing a shell of 1250 pounds, compared with one of 850 pounds. The five turrets containing two guns apiece will be more effectively arranged for broadside fighting, so that the *Thunderer* will have ten guns bearing on the beam compared with the *Dreadnought's* eight. The *Dreadnought*, again, had 11 inches of Krupp steel on her water-line; the *Thunderer* will have 12 inches of Simpson steel. The launching weight of the hull is estimated at 9200 tons.

When completed the *Thunderer* will be 560 feet over all, and will have a displacement of 22,680 tons on a draft of 27.5 feet. Her horse-power will be 31,000, and the approximate cost of the ship will be £1,800,000. She will carry 4000 tons of armor, against the 3000 of the first ship of the type. Her secondary armament consists of sixteen 4-inch guns and two 21-inch submerged torpedo tubes according to some accounts; of twenty 4-inch guns and three torpedo tubes, according to others.

Our first ship named *Thunderer*, a 74, on July 17, 1761, overtook the French *Achille*, 64, and commenced an action. Presently one of the former's guns burst, blowing up part of the poop, causing many casualties, and setting fire to the vessel. However, the British extinguished the flames, continued the fight, and captured the *Achille*. The loss of the victors was heavy, 17 men being killed, 113 officers and men wounded. The *Thunderer* was in the fleet engagement with *d'Orvilliers* off Ushant on July 27, 1778. She was lost in a West India hurricane in October, 1780.

The next ship of the name, also a 74, was built on the Thames, and put afloat in 1783; length on gun deck, 170 feet 8 inches; tonnage measurement, 1679. She was with Lord Howe's fleet at the victory of June 1, 1794. In October, 1795, she took the brig *Eveille* off the French coast. In April, 1797, being on the Jamaica station, she, with another 74, drove ashore the French frigate *Hermione*, 36 guns, which, being set on fire by her own people, blew up. Under Capt. William Lechmere, the *Thunderer* was with Sir Robert Calder when he defeated Villeneuve on July 22, 1805. On that

occasion she had seven men killed and eleven wounded. At Trafalgar she was not able to commence action until late in the day; her casualties were four killed, twelve wounded. On February 19, 1807, she went up the Dardanelles with Vice-Admiral Sir John Duckworth to threaten Constantinople. When returning down that channel on March 3, she was considerably damaged, and had sixteen officers and men killed or hurt. In August of the same year she shared in the expedition to Copenhagen, and on the 23d was sharply engaged with the Danish gun-boats. In 1808 she was in the Mediterranean again.

On September 22, 1831, at Woolwich, was launched another *Thunderer*, 84 guns, 2279 tons measurement. She shared in the attack on St. Jean d'Acre, on November 3, 1840. In 1864 she was appropriated as a "target" ship at Portsmouth, and subsequently received the name of *Nettle*, and survived until 1900.

Our fourth *Thunderer* was launched at Pembroke on March 25, 1872, at that time a most powerful ironclad with two turrets, each of which contained two 700-pounder R. M. L. guns. Her armor extended from stem to stern at the water line, and amidships was a foot thick. While on steam trials off Portsmouth, on July 14, 1876, one of her boilers burst, causing 45 deaths, including those who died in hospital. Having been completed, she went to the Mediterranean, and, on January 2, 1879, in the Sea of Marmora, one of her big guns burst, killing seven men and injuring nearly 40, some of whom did not recover. This *Thunderer* did some years' service in the "Great Sea." Subsequently she was rearmed with 10-inch 29-ton B. L. guns, and became port guardship at Pembroke. She continued as such until near the end of the century, and was sold on July 13, 1909, for £19,500.—*Naval and Military Record.*

THE "CAMELEON."—The arrival of the ocean-going destroyer *Cameleon* at Devonport has created considerable interest, this being the first vessel of the *Acorn* type to be delivered at the Western port. The *Cameleon*, which was built and equipped by the Fairfield Company, of Glasgow, although of somewhat less displacement and general dimensions than the *Viking* and *Beagle* classes, belongs to a group which in gun and torpedo armament and general equipment are a great improvement on those classes. In the *Cameleon* a second 4-inch gun takes the place of the 12-pounder mounted on the quarter deck of the *Beagle* class, and as compared with the *Viking* and her sisters, which only carry two 4-inch, the addition of two 12-pounders placed well forward for chasing will greatly increase the efficiency of the *Cameleon* and her 19 sister boats. The new vessel also carries the 21-inch long range torpedo as compared with the 18-inch tube in the *Viking* class.

The *Cameleon* is oil-driven, and her designed speed of 29 knots was exceeded on trial, the speed being a compromise between the 27 knots of the *Beagle* and the 33 knots average of the *Viking* class. Her complement is 72. She has two search-lights, one mounted on the fore bridge and the other on a raised platform on the fore side of the quarter deck. The 21-inch torpedo tubes are well clear of the upper deck and can be traversed freely and brought to bear on either broadside.

The 4-inch guns are on the latest pattern pedestal mountings, which have the recoil considerably reduced, thus conducing to increased rapidity of fire with consequent improved accuracy. Electricity is installed throughout the ship, and the living quarters are fitted with every consideration for the comfort of both the officers and men.

The following comparative table shows the development which has been made in recent classes of destroyers:

	Cameleon. 1910.	Savage. 1910.	Viking. 1909.
Class	Acorn	Beagle	Amazon
Length	240 feet	264 feet	280 feet
Beam	25¼ feet	28 feet	27.3 feet
Draft	7.9 feet	9.5 feet	8.7 feet
Displacement	780 tons	880 tons	1,000 tons
I.H.P.	13,000	12,500	15,500
Speed	29 knots	27 knots	33 knots
Armament	2 4-inch	1 4-inch	2 4-inch
Guns	2 12-pr.	3 12-pr.	.....
Torpedoes	2 21-inch	2 21-inch	2 18-inch
Fuel carried	160 oil	160 oil	160 oil
Complement	72	76	71

—*Naval and Military Record.*

THE TRAINING OF NAVAL CADETS.—Mr. Reginald McKenna, the First Lord of the Admiralty, has issued an interesting communication on the subject of the preparation of candidates for Osborne College, where naval cadets are trained. This communication is a result of the reception by him of a deputation of head-masters of preparatory schools. The view taken by Mr. McKenna must be regarded as a sound one. He deprecates the idea of special preparation classes in schools, and therefore of specialization in education at a very early age. The object is to secure boys who have had a general all-round training rather than boys who have been "crammed" to pass a competitive examination. The test exacted by the Admiralty for entrance is a simple one, wisely exacted in the course of a personal interview with the boy by a committee who seek to judge of the boy's alertness, general knowledge, and attitude towards things in general. The letter by the First Lord of the Admiralty is as follows:

November 23, 1910.

Sir.—In compliance with the promise made to the deputation of members of the Association of Preparatory Schools which I received on November 2, I willingly write to re-state the position taken by the Admiralty with regard to "special preparation" of candidates for Osborne. The Admiralty are strongly opposed to all special preparation. Ever since the new scheme of entry and training came into operation seven years ago, this attitude has been consistently maintained, and there is not the slightest intention of modifying it. On the contrary, the experience gained during these years has only served to confirm the view that any special preparation of candidates for naval cadetships should be discouraged. It is, in fact, discouraged by every means in our power. We prefer that candidates should receive the usual education which preparatory schools give to boys who are about to pass on to public schools. We even deprecate special "navy classes" in preparatory schools. Any parent who removes his boy from a preparatory school of the ordinary type in order to send him to a school which lays itself out to "prepare for the navy" is ill-advised, and is not improving his boy's chances. We find that the great majority, including the most satisfactory cadets, are those who have received the usual education of a preparatory school up to the time of their entry to Osborne. Upwards of 200 preparatory schools send us boys who have received no special preparation whatever.

You are aware that the system of interview by a committee, which has been pursued since the new scheme came into operation, was adopted as a means of escaping the evils of competitive examination, one of which had been the development of cramming establishments giving special preparation. It has been successful in this object, and I believe there is now no serious danger of a recrudescence of the evil. But it cannot be too clearly

understood that anything in the nature of special preparation is, in our opinion, not only unnecessary, but positively prejudicial.

Believe me, yours very truly,
(Signed) REGINALD MCKENNA.

The Admiralty have adopted a new life-saving apparatus which it is claimed will reduce the danger of loss of life to a minimum in accidents to submarines while they are engaged under water. Messrs. Siebe, German & Co., submarine engineers, of Westminster Bridge Road, are the designers of the apparatus, which has also been adopted in the navies of Japan, the United States of America, Austria, and Norway, and is being put on trial by Germany, France, Italy, and Russia. As the only condition in which the submarine would be unable to rise to the surface involved a large and sudden loss of buoyancy due to an inrush of water, the problem was how to render the crew independent of poisonous gases and prevent the men drowning by providing them with means of escape by ascending to the surface of the water. The apparatus designed for that purpose took the form of a helmet, which is made large enough to allow the head free movement within it, and, sloping away to fit the shoulders, is continued into a short jacket of strong waterproof material. In front of the jacket, inside, is a pocket containing a combined purifier and oxygen generator, consisting of two small chambers, formed in one case. These chambers are charged with a patented substance which, when in contact with the water vapor of the breath, gives off pure oxygen gas and forms a caustic alkali. The alkali then takes up the carbonic acid gas of the respired air and forms an alkaline carbonite. In this way the same air, purified and re-oxygenated, is used over and over again. The jacket can be inflated on its wearer reaching the surface, and in this way forms a lifebelt, while on the window of the helmet being opened the enclosed air is permitted to escape. The apparatus can be put on in thirty seconds and without assistance.—*United Service Gazette.*

AUTOMATIC PISTOLS FOR THE NAVY.—Whatever the reasons at present assigned for the non-introduction of an automatic pistol into the senior service, they will, in all probability, be brushed aside, and such a weapon adopted in the course of a year or so. There are so many points in favor of this course, in spite of the natural conservatism of the navy, which has always prevented any headlong rushes in reform. When one remembers what a mountain of prejudice Sir John Fisher had to surmount before he could move a single step in the direction he had set his soul on going, one wonders how he eventually contrived to go so far as he did. Automatic pistols have been on trial recently, and many of the best naval revolver shots speak well of the weapons when once they had become used to them, although the "kick" was at first rather disconcerting. As London has recently learnt to its cost, automatic pistols are common enough on the Continent, and from the best makers they are as reliable as the present service revolver. They are pre-eminently the weapon for a tight corner, and with their present range are suitable for both ship and shore work. Obviously a pistol is a much handier weapon than a rifle on board ship, and although we are told that boarding is a thing of the past, yet the cutlass and revolver are still naval arms—but the men are not drilled with the cutlass except for show purposes. Pistols are carried ashore for field service, and naval men should be armed with the best weapon on the market so long as prices are reasonable. Another series of trials is shortly to take place, and it is to be hoped, if it is found that an efficient automatic weapon is offered, that the navy will adopt it, and carry such a pistol for use either ashore or afloat.—*United Service Gazette.*

THE MISTRESS OF THE SEAS.—If there is one man in the country who is competent to judge naval policy and to estimate the value of imaginative statements about naval affairs, it is Sir William White, who, as Director

of Naval Construction, has done more in his time to make the British Navy powerful than any other man. And Sir William White shatters, absolutely, the flimsy fabric that has been built up by Lord Charles Beresford, and other partisan critics. In the December number of the *Ninteenth Century and After* Sir William White shows very plainly that facts flatly contradict the allegations put forward by the critics, that our naval supremacy had been lowered, and proves that the navy has now, in comparison with our nearest rival, as great a margin of superiority as it had in 1905, when the last conservative government went out of office. And Sir William White is no political partisan, for in the course of his article he spares neither Mr. Asquith nor Mr. McKenna in his condemnation of hasty assumptions and rash predictions.

Sir William shows that in March, 1906, Germany had 24 capital ships built and building of a total displacement of 290,000 tons; and Great Britain 53 ships of 780,000 tons—a superiority of 29 ships and 506,000 tons. In that year it was universally admitted that we had "an assured position of supremacy." After a similar comparison of ships to the end of March, 1910, Sir William says that "taking grand totals for ships built, building, and to be laid down in 1910-11, the British superiority above Germany was represented at that date by 30 ships and 508,000 tons." Moreover, Sir William White does not believe that Germany wantonly accelerated her shipbuilding program at a critical time in our political history with any sinister object in view. If there was active development it was due, he insists, to an unwise parliamentary paper, which, on the authority of the British Admiralty, informed the House of Commons in 1907 that nine of the twenty German battleships reckoned among effectives of that year were "obsolescent." This had the effect of spurring Germany on to increased output, but, withal, the British Admiralty, "assailed" as they were "with such virulence," kept their heads and adjusted matters "with a good deal of foresight, enterprise, and good judgment." In April, 1913, Germany cannot have in commission and ready for action more than the thirteen battleships already commenced, "with the four of this year and the four of next year in more or less advanced stages of construction. . . . . In April, 1913, the British fleet will have twenty-seven units complete," so that in *Dreadnoughts* alone we have a superiority of more than two to one. On the face of it, therefore, there cannot possibly be a crisis in 1913, as Lord Charles Beresford so fondly predicts.—*United Service Gazette.*

HEALTH OF THE NAVY.—*Continuous Improvement Reported.*—The annual report of the health of the navy has been published as a Blue-book, and shows that last year there was continuous improvement in the general health of the fleet, as compared with the preceding five years. Not only are the case, invaliding, and death ratios for the year under review lower than the average ratios for the last five years, but the average loss of service for each person has again dropped from 10.8 to 9.76 days. The final invaliding ratio also shows a small decrease in comparison with the previous five years' average. The total force in the year 1909, was 112,700, and the total number of cases of disease and injury entered on the sick list was 72,540, which gives a ratio of 643.65 per 1000, a decrease of 75.34 as compared with the average ratio for the preceding five years.

The number of entries per man for disease and injury was: Home station, .76; home fleet, .56; Atlantic fleet, .62; Mediterranean, .61; North America and West Indies, with Fourth Cruiser squadron, .71; China, .71; East Indies, .95; Australia, .61; Cape of Good Hope, .56; and the irregular list, .85. For the total force the average was .64, a decrease of .05 as compared with 1908.

The average number of men sick daily was 3,015.25, giving a ratio of 26.75 per 1000, a decrease of 2.84 in comparison with the previous five years. The total number of days' sickness on board and in hospital was 1,100,568, which represents an average loss of service of 9.76 days for each person,

a decrease of 1.04 in comparison with the average for the preceding five years.

The total number invalided was 2007, which gives a ratio per 1000 of 17.8, a decrease of 4.3 per 1000 in comparison with the average ratio for the preceding five years. The total number of persons finally invalided was 1764. The ratio per 1000 of final invalidings was 15.65, a decrease of .86 per 1000 as compared with the average for the previous five years. Of the 2007 invalids, 1851, giving a ratio of 16.42 per 1000, were for disease, and 156, a ratio of 1.38 per 1000, were for injury.

The total number of deaths was 362, giving a ratio of 3.21 per 1000, a decrease of .54 in comparison with the average ratio for the last five years. Of this number 258, or 2.28 per 1000, were due to disease, and 104, giving a ratio of .92 per 1000, to injury.

Of tuberculosis, 320 cases were recorded, with 209 deaths. Officers furnished 13 cases, viz.: Executive, 5; warrant, 3; engineers, 2; medical, 1; chaplains, 2. The highest ratio per 1000, viz., 6.91, was given by the East Indies, and the lowest, 2.43, by the Atlantic fleet. Cases were returned from every station. Of influenza, 2280 cases were recorded, with four deaths. The home station contributed 639, the home fleet, 1218, the Mediterranean 109, and all the other stations report small numbers, in the case of the East Indies and Cape of Good Hope only eight and five respectively. Ten cases of suicide were recorded.

THE RISK OF INVASION.—Much discussion has arisen in London and Berlin over the publication of "Notes Containing the [British] Admiralty View of the Risk of Invasion" of Great Britain, which, by permission of the British Board of Admiralty, are added as an appendix to the second edition, just issued, of "Compulsory Service," by Gen. Sir Ian Hamilton. These notes, which are signed "A. K. W.," the initials of Admiral of the Fleet Sir Arthur Knyvet Wilson, were prepared, it is officially stated, for the use of the War Office in a debate which was to have taken place last November in the House of Lords on a motion of Lord Roberts, who raised somewhat of a scare at the time by declaring that the shores of these islands were by no means so invulnerable to foreign invasion as their inhabitants liked to think. The debate never took place owing to the intervention of the general election.

The notes as contained in the appendix are as follows:

"The really serious danger that this country has to guard against in war is not invasion but interruption of our trade and destruction of our merchant shipping.

"The strength of our fleet is determined by what is necessary to protect our trade, and if it is sufficient for that it will be almost necessarily sufficient to prevent invasion, since the same disposition of the ships to a great extent answers both purposes.

"The main object aimed at by our fleet, whether for the defence of commerce or for any other purpose, is to prevent any ship of the enemy from getting to sea far enough to do any mischief before she is brought to action. Any disposition that is even moderately successful in attaining this object will almost certainly be effective in preventing a large fleet of transports, than which nothing is more vulnerable or more difficult to hide, from reaching our shores.

"To realize the difficulty that an enemy would have in bringing such a fleet of transports to our coast and disembarking an army it is necessary to remember that all the ships operating in home waters, whether they are in the North Sea, the Channel or elsewhere, are in wireless communication with the Admiralty and the Commander-in-Chief, so that if a fleet of transports is sighted anywhere by a single cruiser or even by a merchant ship if she is fitted with wireless, every ship which happened to be in a position to intercept the transports would at once get the order to concentrate as necessary for the purpose, whether she was at sea or in harbor.

"It is further necessary to remember that, even supposing that by some extraordinary lucky chance the transports were able to reach our coast without being detected, their presence must be known when they arrive there; and long before half the troops could be landed the transports would be attacked and sunk by submarines which are stationed along the coast for that purpose.

"Besides the submarines there would be always a large force of destroyers, either in the ports along the coast or within wireless call, as in addition to those that may be definitely detailed for coast defence the system of reliefs for those acting oversea will insure a large number being actually in harbor at their respective bases or within call while going to or returning from their stations.

"These destroyers, though not specially stationed with that object, will always form, in conjunction with submarines, a very effective second line of defence in the improbable event of such a second line being required.

"To understand thoroughly the small chance of an invasion from the other side of the North Sea being successful, it is necessary to put oneself in the place of the officer who has to undertake the responsibility of conducting it.

"His first difficulty will be to consider how he is to get his great fleet of transports to sea without any information of it leaking out through neutral nations or otherwise.

"Next, he will consider that somewhere within wireless call we have nearly double the number of battleships and cruisers that he can muster, besides a swarm of destroyers.

"He has probably very vague and unreliable information as to their positions, which are constantly changing.

"His unwieldy fleet will cover many square miles of water, and as all the ships will be obliged to carry lights for mutual safety, they will be visible nearly as far by night as by day. How can he hope to escape discovery?

"Many of his transports will have speeds of not more than ten to twelve knots, so that there will be no hope for escape by flight if he is met by a superior force.

"If he is sighted by any of our destroyers at night they will have little difficulty in avoiding the men of war and torpedoing the transports.

"Is it possible to entice part of our fleet away by any stratagem? Possibly. But even if he succeeds in drawing off half our fleet the other half, in conjunction with destroyers and submarines, would be quite sufficient to sink the greater part of his transports, even if supported by the strongest fleet he could collect. The fleets would engage each other, while the destroyers and submarines torpedoed the transports.

"Finally even if he reached the coast in safety he would see that it was quite impossible to guard his transports against the attacks of submarines while he was landing the troops and that it was quite certain that a superior force would be brought to attack him before the landing could be completed.

"Taking all these facts into consideration, he would probably decide, as the Admiralty has done, that an invasion on even the moderate scale of 70,000 men is practically impossible."—*New York Sun.*

THE INVASION QUESTION.—"So I turn to all of you, my countrymen, and I say, Sleep quietly in your beds. Do not be disturbed by these bogeys of invasion which have been periodically resuscitated by all sorts of leagues." It is doubtful if those who refused to accept the assurance of the most capable naval administrator of our generation when he made this pronouncement at the Guildhall in 1907 will now take warning from the words of our most experienced naval strategist and tactician. Yet the views of Sir Arthur Wilson on this important subject are shown to entirely accord with those of Lord Fisher, and with the conclusions at which,

on two occasions, and after most careful investigation, the Committee of Imperial Defence have arrived. Fortunately, those who have used and are using the invasion bogey in order to give support to their pet schemes of defence are comparatively few in number, and the nation as a whole, whose anxieties were allayed by the First Sea Lord in 1907, will also be content to place its fullest confidence in the First Sea Lord of 1911. If Sir Arthur Wilson does not know what the navy can do, and how it is prepared to do it, it is quite certain that no one else does. The importance of the statement and its peculiar interest rest in its being an enunciation of the views of a seaman of the recognized distinction of Sir Arthur Wilson; the explanation it contains of the policy of defence initiated by Lord Fisher as confirmed and developed by his successor; and its warning with regard to the future. The act of invading these islands from the Continent has three clear divisions—embarkation, passage, and disembarkation. So far as the first and last are concerned, the operations are of a conjoint character, about which the views of both soldiers and seamen should have due consideration. But the passage of troops oversea is a matter about which only the naval officer can speak with authority. This being the case, it will be amazing if Sir Arthur Wilson's utterance does not cause a deep impression both at home and abroad. In pointing out that an invasion is practically impossible, the First Sea Lord assumes not only that we have command of the sea, but that we have a fleet of battleships and cruisers nearly double in number that of the fleet at the disposal of the intending invader, and in addition a second line of destroyers and submarines definitely detailed for coast defence. The strength of our fleet, he says, is determined by what is necessary to protect our trade, or in other words, to keep open and secure from molestation our communications with the oversea Dominions and possessions of the Empire. If it is sufficient for this purpose, it is almost necessarily sufficient to prevent invasion, since the same disposition of the ships to a great extent answers both purposes. It is the object of our fleet to meet and disable or destroy any hostile vessel before she can get far enough from her port to prey upon our traders or dislocate our lines of commercial traffic. If it is successful in effecting this purpose, it will certainly also be able to deal with any large fleet of transports intent upon reaching our shores. Sir Arthur Wilson then describes in detail the difficulties which would face an intending invader, and incidentally refers to the immense advantages which wireless has given to the superior naval power. He does not believe it possible that such a fleet of transports as would be necessary could cross the intervening water without discovery, and therefore without avoiding the defending forces. Finally, he says, that even if the invader reached the coast in safety, it would be quite impossible for him to guard his transports against the attack of submarines while he was landing the troops, and it would be "quite certain that a superior force would be brought to attack him before the landing could be completed." This is the only reference to land forces in Sir Arthur Wilson's notes, but he evidently contemplates a sufficiency of troops in this country, not only easily mobile and otherwise effective, but adequate in numbers to make the enemy come in such force as to simplify the work of the navy.

It is in the warning attached both to the pronouncement of Lord Fisher in 1907, and to that of the First Sea Lord three years later, that we find an importance which it is impossible to exaggerate. Lord Fisher prefaced the remarks at the head of this column as follows:

"Our object has been the fighting efficiency of the fleet, the sufficiency of the fleet, and its instant readiness for war; and we have got it."

Unless the conditions there formulated had been fulfilled, the First Sea Lord of 1907 would not, and could not, have told his countrymen to ignore the threat of invasion. Similarly, Sir Arthur Wilson scouts the idea of successful invasion only so long as our fleet is sufficient to carry out its primary duty, the protection of our trade, believing that so long as it is

adequate for this purpose, it will also be able to fulfil that of guarding our shores. He is able to speak as he does because he is assured that the existing naval organization is thoroughly effective for both purposes. That this is the case is due to the provision both of material and *personnel*, and to his plans for the disposition of force which Lord Fisher was making three years ago, and which have now materialized.—*United Service Gazette.*

THE "HYACINTH" ENCOUNTER.—The affair of the *Hyacinth's* landing party, which lost four men killed and ten missing and wounded as the result of a conflict with natives at Debai, in the Persian Gulf, on Christmas Eve, is the most serious that has occurred in the recent history of the measures taken for the suppression of gun-running in that part of the world. The nearest approach to it was in April, 1908, when two men were killed, and others, including Lieut. Baillie-Hamilton, had narrow escapes, during an attempt of the boats of the *Proserpine* to cut out two dhows moored close inshore off Bunji, about forty miles west of Jask, on the Persian seaboard. Important developments, however, have taken place since then, and the activities of the East Indies squadron, and especially of its Persian Gulf division, appear to have administered a decided check to the arms traffic from the free port of Muscat, so much so that the traders are beginning to establish depots at other places on the Arabian side where they had hoped, no doubt, to be less hampered by British interference. This is an important result of the blockade which Rear-Admiral Slade, in cooperation with the Indian authorities, established during the gun-running season. Under the orders of Captain A. T. Hunt, of the *Fox*, the officers and men of the blockading squadron were very successful in the efforts they made to put down the traffic, and besides the dhows that were captured during their passage across the Gulf, on several occasions parties of seamen and marines were landed to search for and destroy stores of fire-arms ashore. The dangerous nature of the work upon which they have been engaged will be recognized afresh by the loss of valuable life in the *Hyacinth.*—*Army and Navy Gazette.*

The first of three tactical exercises in connection with the assembly of the home, Mediterranean, and Atlantic fleets commenced on Jan. 25, off the Spanish coast. The fleets were divided into "Blue" and "Red," the former consisting of the First and Second Battle squadrons and the First and Second Cruiser squadrons of the home fleet, numbering twelve battleships, eight armored and four small cruisers, while "Red" comprised the Mediterranean and Atlantic fleets and their respective cruiser squadrons, numbering ten battleships, six armored, and one small cruiser. The first of the tactical exercises lasted two days, and on their conclusion the home fleet returned to Arosa Bay and the combined Mediterranean and Atlantic fleets to Vigo. On Jan. 30 and 31 the three fleets carried out battle exercises, anchoring Feb. 1 in Ponte Vedra Bay, which anchorage they left on Feb. 2 for further exercises, in which the junior flag officers directed the movements. The operations concluded Feb. 4, when the fleets dispersed from Ponte Vedra. The home fleet will return to Portland, carrying out a full-power steam trial during the passage. The Atlantic fleet will proceed to Gibraltar for preliminary practice for the gunlayers' test, and the Mediterranean fleet will steam to Malta.—*United Service Gazette.*

THE DECLARATION OF LONDON.—The Declaration of London has been shelved. Sir Edward Grey has been prudent enough to bow before the storm of hostile criticism which his White Papers have failed to abate. The strong and emphatic protest of the Commonwealth Government appears to have had as much weight with Sir Edward Grey as the protests of the many Chambers of Commerce of the United Kingdom. Pending the Colonial Conference next summer, the Declaration of London is very properly set aside by H. M. Government, and no attempt will now be made to force the Naval Prize Bill through Parliament. That is how the matter

now stands, and even the warmest supporters of the proposed measure should be able to recognize the prudence of delay. Despite his somewhat intemperate heat, the thanks of the country is due to Mr. T. Gibson Bowles for the part he has taken in this memorable controversy. His book "Sea Law and Sea Power," already examined in our columns, appeared at the critical moment when Sir Edward Grey was on the verge of presenting the Prize Bill to the House of Commons. Possibly the Upper House would have seen fit to reject the bill on the second reading, but that could not be counted upon.

British Chambers of Commerce are fairly unanimous in condemning the Declaration on four important points. These are:

1. The destruction of neutral prizes at sea.
2. The conversion of merchant ships into war cruisers.
3. Certain clauses dealing with unneutral service.
4. The inclusion of foodstuffs under the head of contraband goods.

These clauses and others ought to be threshed out in Parliament before we ratify any fresh treaty. It is ridiculous for the Powers to say that we must accept the Declaration of London as a whole or not at all. There is no justice or reason in such a claim. The proposed treaty has faults, and these have to be expunged. There is no urgent need to make any new treaty with the Continental Powers, and consequently no occasion for hasty action.

As for the Naval Prize Bill itself, the original favor with which the idea of a supreme tribunal at The Hague was received by the English Press has been considerably modified since. In the present state of disagreement as to the rights of neutrals and belligerents it is improbable that any international court would be able to administer prize law to the general satisfaction. Our own naval prize courts have administered the law fairly and impartially, and to the admiration of many foreign jurists. The decisions of Lord Stowell in many difficult cases are quoted in every continental prize court to this day. British representation upon The Hague tribunal ought in any case to be properly guaranteed. It is not guaranteed under the Declaration of London, for many minor States and petty Republics will be as strongly represented on the list of judges as Great Britain with her enormous sea trade. We admit that a supreme international prize court is an ideal towards which the nations should strive in the interests of peace and concord. That the time has come for creating such a tribunal is, however, by no means evident.—*Naval and Military Record.*

ITALY.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Dante Alighieri	19,000	Gov't Yard, Castellamare.	Launched Aug. 20, 1910.
Cavour.	22,000	" " Spezia.	Building.
Giulio Cesare	22,000	Ansaldo-Armstrong.	"
Leonardo da Vinci ...	22,000	Genoa (Odero).	"
Armored Cruisers.			
San Giorgio.....	9,800	Gov't Yard, Castellamare.	Under trial.
San Marco	9,800	" "	" "
Georgios Averof.....	9,800	Leghorn (Orlando).	Launched Mar. 12, 1910.
Scouts.			
Quarto.....	3,400	Venice.	Ordered.
Marsala	3,400	Castellamare.	"
Nino Bixio.....	3,400	"	"

The budget for 1911-12 amounts to 192,345,000 francs, an increase of 8,600,000 over the preceding year. Of the total, 160,206,000 francs is for strictly naval purposes and the remainder for the merchant marine.

The *Dante Alighieri*, the first of the new type of Italian battleships, which was recently launched, is attracting much interest on account of her arrangements of triple turrets. The ship displaces 19,250 metric tons, and is 510 feet long with 85 feet beam, and a mean draft of 26 feet. The armor is 10 inches thick amidships, tapering to 6 inches forward and 4.7 inches abaft, while the turrets have 10-inch armor, and the conning-tower 12-inch. The main armament consists of twelve 12-inch 47-caliber guns mounted in four triple barbettes on the middle line. The projectiles of these guns weigh 900 pounds. The secondary armament consists of twenty 4.7-inch 50-caliber guns and sixteen 3-inch. The ship will have five searchlights, and there will be for the first time in the Italian Navy, Bullivant torpedo nets. She will have four torpedo tubes, two forward and two aft. Her estimated speed is 21 knots; more is probable.—*The Engineer.*

The *Revista Nautica* says that the *Dante Alighieri* will have a displacement at least 1200 tons in excess of that for which she was designed, the draft being correspondingly increased by 40 centimeters, or about 16 inches. The result, it is stated, will in no way impair the efficiency of the ship. The speed will be reduced by three- or four-tenths of a knot, but this can be spared, as the *Dante Alighieri* will even then be over half a knot faster than the three other ships of the program. The additional submersion of the armor-belt is considered immaterial, as Italian ships as a rule have less armor below the water-line than those of other nations. An expert committee decided that the ship would be a perfectly efficient unit without any alterations in design being made.

The Italian Minister of Marine has issued orders for the building of six destroyers of 700 tons and 12 sea-going torpedo-boats of 300 tons. The destroyers will be named *Impavido, Intrepido, Indomito, Impetuoso, Irrequieto,* and *Insidioso.* Eighteen other torpedo-boats are to be put in hand, and the whole series will be known as *1 P. N.* to *12 P. N.* (Pattison, *Naples*), *O. S. 13* to *O. S. 24* (Orlando, Sestri Ponente), and *A. S. 25* to *A. S. 30* (Ansaldo, Armstrong). The following submersibles have been put in hand: *Nautilus* and *Nereide* (Venice), *Velella, Fantina, Fisalia, Argo Salpa, Zoea,* and *Falea* (Muggiano), and *Giacinto Pullino* and *Galileo Ferraris* (Spezia). According to the *Esercito Italiano,* the first *Dreadnought,* the *Dante Alighieri,* will be completed in October, 1911. The same authority states that the second vessel of the class, *Conte di Cavour,* will be launched next August, within twelve months of the date of laying down, and that the whole four of these vessels will be completed by January, 1913.—*Army and Navy Gazette.*

JAPAN.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Satsuma	19,200	Yokosuka.	Under trial.
Aki	19,800	Kure.	" "
Kawachi	20,800	Yokosuka.	Launched Oct. 15, 1910.
Settsu	20,800	Kure.	Building.
Armored Cruisers.			
.....	27,000	Vickers.	Building.
Protected Cruisers.			
Shikuma	5,000	Sasebo.	Building.
Yahagi	5,000	Nagasaki.	"
Hirado	5,000	Kobe.	"

The armored cruiser *Kurama,* of 14,600 tons, has completed her trials, and, it is reported, will go to England in April for the Coronation ceremonies, accompanied by the *Tone,* under the command of Vice-Admiral Shimamura.

The keel of the armored cruiser under construction by Messrs. Vickers, Sons & Maxim, for the Japanese government was formally laid at the naval construction works, Barrow, on Jan. 17. The vessel will be one of the largest of her class afloat, though all official particulars concerning her are being withheld by command of the Japanese authorities. Capt. Fujiwara, acting chief inspector of the Japanese Navy in London, performed the ceremony.

The Tokio correspondent of the Press Association says:

The announcement of the placing of an order in England for a battleship came as a surprise throughout Japan. Criticism might have been directed at the authorities because of this departure from the policy announced some time ago, by which the government is pledged to build war vessels in the Japanese ship-building yards. The premise was made to conciliate the taxpayer in some degree. But those who might have complained in the Diet are effectively silenced by the official explanation. The Navy Department has issued a statement in which it is set forth that the Navy Department thought it necessary to secure the latest model of battleship and specimen of the art of shipbuilding. The armament of the new vessel is kept a profound secret.

The following figures give the expenditure for naval reconstruction in the fiscal year 1909-10 and after:

	For Ships. Yen.	Armaments. Yen.	Total. Yen.
1909-10	6,400,409	2,289,177	10,687,586
1910-11	9,182,004	4,507,582	10,689,586
1911-12	7,831,909	4,107,677	10,939,586
1912-13	7,440,409	3,849,177	11,289,586
1913-14	7,758,632	3,330,954	11,089,586

—*Naval and Military Record.*

The conditions and development of the Japanese Navy are matters of interest, not only from a naval, but also from a political point of view. From the papers just to hand from Japan we learn that, although the decision of the Japanese government to place the construction of an armored cruiser, with a displacement of 27,000 tons, with the firm of Messrs. Vickers' Sons & Maxim, has caused some discussion, it was arrived at after a deliberate consideration of the question of the designs submitted and of the present conditions of the Japanese naval arsenals and private yards, which are now fully occupied with naval construction, as was declared in the official statement. Excluding the new battleship *Aki* (19,800 tons) and the armored cruiser *Kurama* (14,620 tons), which are practically completed, ten warships, of altogether 66,000 tons, are in the course of construction at the four naval arsenals and at the Mitsu Bishi and Kawasaki shipyards. The types and names of these warships are as follows:

Name.	Displacement. Tons.	Place of Building.
Battleships.		
Settsu	20,800	Kure Arsenal
Kawachi	20,800	Yokosuka Arsenal
Cruisers.		
Chikuma	4,950	Sasebo Arsenal
Yahagi	4,950	Mitsu Bishi Yard
Hirado	4,950	Kawasaki Yard
A river gun-boat	250	Sasebo Arsenal
Destroyers.		
Umikaze	1,150	Maidzuru Arsenal
Unknown	800	" "
"	800	" "
Yamakaze	1,150	Mitsu Bishi Yard

The actual strength of the Japanese Navy at present is shown in the following table:

	Tons.
Battleships (14)	222,234
Time-expired battleship (1)	10,960
First-class cruisers—armored and unarmored, of 8000 tons or upwards (13)	138,052
Second-class cruisers, from 4500 tons upwards (7)	38,052
Third-class cruisers, from 2000 tons upwards (13)	43,713
Destroyers (57)	—
Torpedo-boats (59)	—
Submarines (13)	—

The Japanese at once strike off the effective list the ships which become out of date and inefficient. Some time ago it was announced that the Chinyen was to be struck off, and it is now stated that the same fate will befall the *Iki*. It seems only yesterday that the Chinyen figured upon the scene as one of China's two battleships which were strong enough to hold command of the Eastern seas until their flags were lowered in the battle of the Yellow Sea, and at Weihaiwei. As for the *Iki*, she took her part in the Russo-Japanese War as the *Emperor Nicolai First*, and had previously acted a prominent part in Far Eastern waters, for she was the flagship of the Russian Admiral at Chefoo when Viscount Ito Myoji proceeded thither for the ratification of the Shimonoseki treaty. She now goes to the scrap-heap, and her place is taken as a unit of the training squadron by the *Fuji*, which was one of Japan's first two battleships—the battleships for which the Diet refused to grant money until the Emperor decreed that 10 per cent of all official salaries, beginning with the privy purse, should be assigned for naval purposes during a period of ten years. The ideas of the Japanese have grown much since that time.—*Engineering*.

RUSSIA.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Emperor Paul I	16,900	St. Petersburg.	Under trial.
Andrei Pervozvannui	16,900	"	"
Evstafi	12,500	Nicolaiev.	"
Sevastopol	23,000	St. Petersburg (Baltic Wks.).	Building.
Petropavlovsk	23,000	" "	"
Poltava	23,000	" (Admiralty Yd.).	"
Gangoot	23,000	" "	"
Armored Cruisers.			
Bayan	7,800	St. Petersburg.	Under trial.
Pallada	7,800	"	"
Protected Cruiser.			
Outchakoff	6,750	Sevastopol.	Building.

SPAIN.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
España	15,400	Ferrol.	Building.
Alfonso XIII	15,400	"	"
Jaime I	15,400	"	Ordered.

UNITED STATES.

VESSELS BUILDING.

No.	Name. *Battleships.*	Speed. Knots.	Where Building.	% of Completion Dec. 1.	Jan. 1.	Feb. 1.
30	Florida.....	20¾	Navy Yard, New York.	85.7	86.7	89.1
31	Utah.....	20¾	New York Shipbl'g Co.	92.3	94.3	95.6
32	Wyoming.....	20½	Wm. Cramp & Sons.	46.3	48.6	51.0
33	Arkansas.....	20½	N. Y. Shipbuilding Co.	52.8	55.4	58.1
35	Texas.....		N'pt News S. B. Co.	0	0	0

FRENCH OPINION OF THE UNITED STATES BATTLE FLEET.—The prolonged sojourn of the United States battle divisions in the Brest and Cherbourg roadsteads has called the attention of French naval men to the rise of American naval power as well as to the special methods of American naval construction. It is the prevailing opinion that outside the British home fleet no European sea force could safely tackle Rear-Admiral Schroeder's armada. The *Dreadnoughts* (two *Delawares* and two *Michigans*) have been much admired, and are judged much superior, with their aggregate broadside of 36 guns of 305-mm. bore, to the four *Nassaus* of the Fatherland, which can only put in line abeam 32 weapons of 280 mm., and a similar inferiority depreciates the German *Deutschlands* (broadside of 1800 kilos) when compared with the larger *Georgias* and *Louisianas* (broadside of 2500 kilos), which have the twofold advantage of volume of fire and of greater penetration. The superior military utilization of the displacement in the United States ships is the object of general praise. Such vessels, it is remarked, are the production of the wise policy of the American Naval Board, which from the first aimed at size and hitting power, and trusted in big guns.

The *Georgias* and *Louisianas* are considered to be, with the British King Edward, which they much resemble in their general conception, the best pre-*Dreadnought* ships in existence. They carry a heavier armament than any of their contemporaries (four 305-mm., eight 203-mm., and twelve 178- or 152-mm. guns), materially superior to that of a *Patrie* (four 305-mm. and eighteen 165-mm.) and of a *Liberté* (four 305- and ten 194-mm.). At the same time, many French officers prefer the *Patrie* type to the American *Georgias*, pointing out in support of their contention the higher free-board (23 feet against 18) of the French 14,900-ton cuirassés, the greater command and arc of fire of their artillery, mostly placed in turrets on the upper deck, and their superior protection on the waterline, especially on the extremities. Unfortunately, there is no escaping from the fact that a vigorous attack is the most effective means of defence, and it is to be feared that, should a *Patrie* and a *Georgia* come into conflict, all the good qualities claimed for the Gallic ship would be of little avail against the terrific broadside of the (so-called) over-gunned American vessel.—*Naval and Military Record.*

In an article on the subject of the American Fleet, *La Vie Maritime* makes the statement that "Outside of the British home fleet, there does not now exist in Europe any naval force capable of successfully opposing Admiral Schroeder's formidable armada. The German High Sea Fleet, even augmented with all its reserves, would find itself in a state of manifest inferiority."

LAUNCH OF THE "ARKANSAS."—The United States battleship *Arkansas* was successfully launched at the yards of the New York Shipbuilding Company, Camden, N. J., Jan. 14.

The *Arkansas* is 562 feet long over all, 554 feet long between perpendiculars, 93 feet 2½ inches breadth on load-water-line, with a mean draft of 28 feet 6 inches. The full-load displacement will be 27,243 tons; the nor-

mal displacement, with two-thirds supply of stores and fuel and full supply of ammunition, 26,000 tons, and the estimated displacement on trial, 26,000 tons. The ship is to be driven by Parsons turbines on a four-shaft arrangement, which it is estimated will develop a total of 28,000 shaft horsepower, giving the vessel a speed of 20½ knots. A bunker capacity of 2500 tons is provided and 400 tons of oil fuel will also be carried. The boilers are of the Babcock & Wilcox watertube type.

The armament of the vessel will consist of twelve 12-inch guns mounted in pairs in turrets on the center line of the vessel, and twenty-one 5-inch rapid-fire guns for defense against torpedo-boat attack. There will also be four 3-pounders, two 1-pounder semi-automatic guns, two 3-inch field pieces and two .30-caliber machine guns. Two 21-inch submerged torpedo tubes complete the armament.

The construction of the *Arkansas* was authorized March 31, 1909, and the contract with the New York Shipbuilding Company was signed Sept. 15, 1909. The keel was laid Jan. 25, 1910, and the ship will be completed May 25, 1912. The contract price of hull and machinery was $4,675,000 (£963,000).—*Iron Age.*

ORDNANCE AND GUNNERY. TORPEDOES.

PROTECTING ANTI-TORPEDO ARMAMENT.—A departure is to be made in British battleships and battleship-cruisers, in regard to mounting the anti-torpedo armament. All the guns mounted for this purpose hitherto, in British battleships, ranging from 4 inches to the light three-pounder in the older ships, have been left unprotected; their shields being considered superfluous and an unnecessary addition to weights carried by the ship. To keep down all superfluous weight has been the object of designers of late years, as it was realized that every ounce of weight saved in unnecessary details gave more flotation, on the same displacement, for such essentials as thicker armor, more (or larger) guns, more coal for a large cruising area without refuelling ship, or more rounds per gun, so that the magazines and shell rooms would not be so soon depleted in action. As torpedo craft did not hit back with guns when making a torpedo attack on large ships, to put anti-torpedo guns behind armored plates, or armored shields, was considered unnecessary laying on of weights, and so this policy was not adopted in British ships. Experience in the Russian-Japanese War, however, showed that the unprotected, or partly protected, anti-torpedo guns were rendered entirely useless by the fragments of exploding shell during a general engagement, and left the ships without proper protection against torpedo craft when they were let in after the general action between the big ships had ceased. It is to guard against such a catastrophe in British ships that the anti-torpedo guns are to be placed behind shell-resisting armor in our future capital ships.—*United Service Gazette.*

THE "NEPTUNE" EXPERIMENT.—The experimental cruise of the British battleship, *Neptune*, which recently hoisted the pennant, at Portsmouth, is being watched with great interest by those interested in naval gunnery matters. Not only has the *Neptune* super-firing turrets and the echelon system of disposing them combined, but she is also fitted with an improved system of laying and firing the guns, which has been engaging the attention of gunnery specialists for a long time past. The idea is to so arrange the hydraulic or electrical power system that works the heavy guns in the turrets in such a way that the whole of these weapons can be laid for the object by an officer in an armored central sighting position, and fired at the proper moment, without any aid from the men in the turrets, who would simply have to carry out the functions of loading, etc., while the system remained undisturbed by the enemy's fire. The system once penetrated, the men behind the gun would have to take up the work of laying

and firing as well as otherwise working the gun, as is done at present and has been done in the past. So that the idea of displacing the man behind the gun, such as some of our contemporaries have been discussing, is absurd on the face of it—at least at present, whatever the future may produce. It is towards the above end that improvements have been introduced into the *Neptune*, and if they come up to expectations there will, in all probability, be further developments along the same lines in our next warship with power-worked guns.—*United Service Gazette.*

As far as can be judged from the published naval estimates, Germany's total yearly expenditure for target practice in the fleet was only about $325,000 in 1910, and will be only about $375,000 this year.

FIRE CONTROL STATIONS IN GERMAN SHIPS.—It has long been rumored that the Germans were making experiments, to which a certain amount of success was attributed, with a system of observation for fire control purposes, intended to replace the elevated and exposed control positions which are now employed. Matters of this kind are necessarily confidential, and the statements which are made with regard to the new system appear to proceed on the lines of the most probable. If a concealed central station is to replace the elevated observing station, it is hardly possible to conceive how this can be accomplished otherwise than by reflection. The periscope of the submarine appears to be the type of such apparatus. The Germans are, perhaps, pre-eminent in optical science, and it is conceivable that they have attained results much in advance of anything yet achieved. Prismatic telescopes and fine adjustments may probably enable measurements to be made with extreme accuracy, and thus may permit fire to be controlled from below the water line. There must, of course, be elevated tubes for such appliances, and it is a question whether they will not be as liable to destruction as the existing stations. If they offer a lesser target, they will be much more frail, and perhaps liable to destruction by splinters. On the other hand, it may be possible to multiply such appliances, and the system may be applied even to the navigation of the ship. It is stated that the German new ships will have such appliances, in association with tubes on the sides of the ships, not much above the water line, giving a telescopic view of near objects.—*Army and Navy Gazette.*

SHOOTING IN THE BRITISH NAVY.—We have just received the three annually published Blue-books, "Result of Test of Gunlayers with Heavy Guns," "Result of Test of Gunlayers with Light Quick-firing Guns," and "Result of Gunlayers' Test from Torpedo-boat Destroyers," which show the records made during 1910 in the British Navy. We have been accustomed for some years past to refer to these books and to discuss the improvement made in the shooting of our sailors. This has not always been an easy task, since the conditions have been altered from time to time, so that comparison from year to year becomes impossible. Thus in 1907 a smaller target was introduced, and is still retained, and since no dimensions were given of the two targets, it was exceedingly difficult to form a conception of the relative excellence of the shooting of, say, the years 1906 and 1908. Nevertheless, there was very considerable improvement, as we showed at the time, though it was hard to form a comparative idea of it. This year again there has been another innovation. Hitherto if a shot has hit the water before reaching the target it has been regarded and counted in the returns as a whole hit. In the 1910 returns it only counts as a half hit. Hence the returns of 1910 are not directly comparable with those of the years immediately preceding it.

A noticeable feature of the 1910 returns regarding the heavy guns is the considerably fewer number of rounds fired. There were 117 ships which fired, and the number of guns or turrets concerned was 1318. This is a greater number of guns than in either 1908 or 1909, yet whereas in 1908

9009 rounds, and in 1909 9438 rounds were fired, in 1910 the number was only 7209—an average of some 2000 rounds less, taking the aggregate of the two years and dividing by 2. No explanation of this is given in the Blue-book. The details of the rounds fired, the hits, the misses, and the percentage of the former to the rounds fired for the three years 1907, 1908, 1909, and 1910 are as follows:

	1907.	1908.	1909.	1910.
Total rounds fired	9,538	9,009	9,438	7,209
Number of hits (direct)	4,073	4,826	5,108	3,520
Number of ricochets	—	—	—	436
Number of misses	5,465	4,183	4,330	3,253
Percentage of hits to rounds fired	42.70	53.57	54.12	51.85

At first sight it would appear that there had been a setback in the shooting, as evidenced by the fall in the percentage of hits to rounds fired; but if, as in former years, the ricochets had been counted in full the figure 51.85 would become 54.86, which shows an improvement of .74 per cent on 1909. This may not seem very large, but it must be remembered that the standard of 1909 was already very high indeed. The improvement on the results of 1907, the year in which the smaller target was introduced, is very marked.

The analysis of the hits per gun per minute show, in the big guns—12-inch, 10-inch, 9.2-inch, and 7.5-inch—an advance as compared with the year before, and in the case of the 6-inch B. L. and Q. F., the 4.7 Q. F. and the 4-inch B. L. and Q. F. guns, a slight falling off. Here again, however, the question of the alteration in scoring ricochets must be borne in mind. The comparative figures of hits per gun per minute for the years 1907, 1908, 1909, and 1910, are as follows:

	1907.	1908.	1909.	1910.
12-inch and 10-inch	.40	.56	.63	.70
9.2-inch	2.01	2.20	1.94	2.01
7.5-inch	1.58	2.51	2.47	2.61
6-inch B. L. and Q. F.	3.32	3.98	4.03	3.69
4.7-inch Q. F. and 4.0-inch B. L. and Q. F.	2.38	3.32	4.06	3.84

In comparing these figures, it will be realized that in 1909 the shooting with the smaller guns was phenomenal.

Turning now to the smaller guns—12-pounders, 6-pounders, and 3-pounders—we find again a very considerable falling off in the number of shots fired, this falling off being entirely out of proportion to the number of guns concerned. The shooting also is not quite so good. The following are the figures for the years 1907, 1908, 1909, and 1910:

	1907.	1908.	1909.	1910.
Number of guns	1,898	1,384	1,407	1,531
Number of rounds fired	17,734	12,943	14,276	8,020
Number of hits (direct)	7,462	6,120	7,157	3,483
Number of ricochets	—	—	—	283
Number of misses	10,272	6,823	7,119	4,254
Percentage of hits to rounds fired	42.08	47.28	50.13	45.19

Counting the ricochet as a whole hit, the percentage of hits to rounds fired in 1910 would have been 46.96. This is better than in 1907, but not so good as in 1908 and 1909.

As regards the hits per gun per minute, these would appear to be nearly up to the average, though it is impossible to judge accurately owing to the

new way of counting ricochets. The figures for the last four years are as follows:

	1907.	1908.	1909.	1910.
12-pounders	4.471	5.319	6.005	5.454
6- and 3-pounders (except Vickers')	3.640	4.507	4.191	3.651
3-pounder (Vickers')	6.140	6.069	7.810	6.127

The returns concerning torpedo-boat destroyers have been entirely remodelled, and the very name of the Blue-book has been changed from "Result of Battle Practice from Torpedo-boat Destroyers" to the title given at the commencement of this article. Hence no comparison is possible with former years. Nevertheless, the information given is of considerable interest. The guns concerned are the 4-inch B. L.; the 12-pounder 12 cwt.; the 12-pounder 8 cwt., and the 6-pounder. There were 175 ships engaged in the test, and they had a total of 736 guns. The total number of rounds fired was 3847, the number of direct hits 1545, of ricochets 171, and of misses 2131, the percentage of hits to rounds fired being 42.38 on the average.

The details of the practice made with the various types of guns are given in the following table:

Nature of gun.	Rounds fired.	Hits.		Misses.	Percentage of hits to rounds fired.
		Direct.	Ricochet.		
4-in B. L.....	140	62	5	73	46.07
12-pr. 12 cwt. on P.V. and V.I. m't'gs	135	57	9	69	45.56
12-pounder 12 cwt. on P. I. mountings	1052	386	51	615	39.12
12-pounder 8 cwt.....	461	125	17	319	29.06
6-pounder, with telescopes.....	1921	878	82	961	47.84
6-pounder, without telescopes.....	138	37	7	94	29.35

The hits per gun per minute with the 4-inch B. L. gun averaged 3.63, with the 12-pounder 12 cwt. gun 3.88, with the 12-pounder 8 cwt. gun 2.73, and with the 6-pounder 6.43.—*The Engineer.*

GUNNERY IN THE BRITISH NAVY.—It is in no way derogatory to the great ingenuity and experience displayed at the Admiralty and in factories in the design and construction of the *matériel* for the navy to say that the ultimate efficiency of ships, machinery, and ordnance must depend, in Britain's hour of need, upon the officers and men of the fleet. Three branches of the Service are responsible for success in war operations; the tactician on the bridge, the engineer in the turbine-room and stokehold, and the man behind the gun. They are interdependent; should any one fail in the duties of his respective office, the value of the work of the others is depreciated. The almost continuous exercises undertaken by the fleets, by night and by day, give confidence in the view that in respect of tactics our ships will be brought into favorable positions of attack. The absence of machinery failures, notwithstanding the extent of maneuvers now undertaken, and the realization of the maximum speed possible, whenever required, indicate that the engineering branch of the navy is thoroughly efficient. As regards gun-fire it is possible to have direct testimony in the results published annually of "the test of gun-layers." The test conditions have from time to time been increased in severity; yet the gunner rises to the demand made upon him. Thus the speed at which the ships steam past the target has been increased within recent years, and the target has been reduced in area. Now the target, which is towed at an unknown speed, course, and

range, relative to a practicing battleship, is only 90 feet long by 30 feet high—less than one-fifth of the length of a ship of the line, and yet, during 1910, with 10-inch and 12-inch guns, the ships of the fleet attained, on an average, 0.7 hit per minute, against 0.4 four years ago; the 9.2-inch guns, 2.01 hits per minute; the 7.5-inch guns, 2.61 hits, against 1.58; and the smaller guns still higher rapidity.

The details show that 117 ships engaged in tests of guns ranging in bore from 12 inches down to 4 inches, and with an aggregate of 1318 turrets or guns. From these guns 7645 shots were fired in practice, and 3520 of these hit the target, small as it was, while, in the case of 872 rounds more, the shot ricocheted on to the target. Formerly such ricochet shots counted a hit, and on this basis the percentage of hits to the total rounds fired is 54.86 per cent for the past year, against 54.12 per cent in the previous year, 53.57 per cent in 1908, and 42.7 per cent in the year 1907, prior to which the firing conditions were less onerous. Within six or seven years the improved efficiency of the gunner, assisted by great improvements in the sighting mechanism and more satisfactory gun-control systems, has at least doubled the effective utility of every gun on board ship. That there is room for further improvement is suggested by the splendid performance in some individual ships. Thus the *Téméraire*, one of the later battleships, with ten 12-inch 50-caliber guns, fired 37 rounds, and scored 29 direct and 3 ricochet hits, or about 81.91 per cent of hits to rounds, reckoning the ricochet as a half-hit. This equalled 3.35 hits per gun per minute. The *Lord Nelson*, with her four 12-inch guns, returned 3.23 hits per gun per minute and with her 9.2-inch guns, 3.64 hits per minute; but this latter was lower than with the same gun in other ships. The *Bedford* marks the attainable standard for the 6-inch quick-firing gun. This ship, which has, unfortunately, been lost, takes first place for the year. Firing 62 rounds, she made 39 direct and 9 ricochet hits, equal to 5.46 hits per gun per minute, while the best gunner of the ship got 10.31 hits per minute for his gun. With a 4.7-inch gun a gunner on the *Astrea* got 11 hits per minute. These performances should stimulate other gunners to greater practice and keenness, as the highest performances per gun per minute are far above the average per gun in the case of the best ships' performance with each type of gun; for the 12-inch gun 3.35 hits, against 0.7 hit; for the 9.2-inch, 5.34, against 2.01 hits; for the 7.5-inch, 5.32 hits, against 2.61 hits; for the 6-inch quick-firing gun, 6.08 hits, against 3.69 hits; and for the 4.7-inch or 4-inch, 8.06 hits, against 3.84 hits. The China squadron did best during the year with 56.628 points. Next came the second division of the home fleet with its cruiser squadron with 47.567 points; then the Cape squadron, followed by the other divisions of the home fleet, the Atlantic fleet, the East India, and Mediterranean and Australian squadrons.

As regards the smaller guns—from 12-pounder to 3-pounder—it is shown that the number of hits per 100 rounds is 45.19. In the case of the 12-pounder gun the number of hits per minute—the average for the whole fleet—was 5.454; for Vickers 3-pounder guns, 6.127; and for the other makes of 6-pounder and 3-pounder guns in the Service, 3.651 hits.

The gun practice of the torpedo-boat destroyers is of great importance. Of this type of ship, 175, with 736 guns, engaged in practice, and succeeded in making 42.38 hits per 100 rounds fired. The 4-inch guns with which these vessels are fitted justified their adoption, as they succeeded in getting a percentage of hits to shots fired of 46.07, whereas the 12-pounder, on the later mountings, gave 45.56 per cent, and the 12-pounder on the earlier mountings 39.12 per cent; the 12-pounder 8-cwt. gun, 28.96 per cent; the 6-pounder with telescopes, 47.84 per cent, and without telescope, 29.35 per cent. As regards hits per minute, the 4-inch further justified itself, as its greater striking power, as compared with the other guns on these vessels, has not been purchased at the expense of rapidity, since the difference is inappreciable—3.63 hits per minute for the 4-inch gun; 3.88 for the 12-pounder 12-cwt. gun, and 2.73 for the 12-pounder 8-cwt. gun. The best

results got from any 4-inch gun in destroyers gave 9.43 hits per minute; the 12-pounder 12-cwt. gun, 12.50; and the 6-pounder and 3-pounder with telescopic sights, 18 hits, and without telescopic sights, 12 hits. These figures indicate the possibilities of further improvement, although it must be admitted that, in view of the large number of guns fired in the tests, and the varying conditions as to weather, etc., the average is high, and justified the approval expressed by their Lordships of the Admiralty.—*Engineering.*

FRENCH TARGET PRACTICE.—Considerable discussion has been caused in the French Navy by recent decisions in regard to what are known as the *tirs d'honneur.* Ships which have secured the best results have, by a revision of the awards, been displaced by others. The *Moniteur de la Flotte* says that there is a strong movement, accelerated by this incident, for the suppression of this competitive firing, because the results are falsified by a confusion of rules. The principal object has been to excite healthy emulation, but it is doubtful whether emulation has not suffered by a comparison which is not strictly equitable. Emulation depends mostly upon the officers, and who, asks the *Moniteur,* would think that officers capable of an effort to prepare their men for the competition, would not make a continuous and conscientious effort to prepare their men for actual fighting? Some disadvantages connected with the present system are pointed out. Previous to the year 1910 the results were judged by the number of rounds which reached the mark within a specified time whatever might be the caliber, and no effort was made to elucidate the respective values in relation to the number of rounds fired by the big and medium caliber guns. Too much attention has been paid to rapidity of fire, which could not be maintained in action. Other complications are mentioned, and the conclusion is that the *tirs d'honneur* have gone too far. They must therefore either be suppressed or interrupted until some further experience has been gained of the better conditions required for really effective competitive firing.—*Army and Navy Gazette.*

The remarkable progress the French Navy has recently made in gunnery has created among naval men a regrettable divergence of views as to the principles which must preside over the handling of battle fleets in action. To the contention of ship-commanders of the "vieille école" that battles are won by clever tactical moves and by out-maneuvering the enemy, gunnery officers, headed by Admiral Le Bris, of the "Ecole de Canonnage," judiciously reply that the all-important thing is to paralyze and destroy the enemy by keeping him, from the outset of the action, under a well-sustained and accurate fire, and that for this reason, maneuvering must be made subservient to the utilization of the gun since the latter is obviously the determining factor in sea warfare. The unfortunate thing is that expert gunnery is rather a novelty in the French service, and that many "commandants" do not realize, like their English collègues do, that any maneuvering not having for its object an increase in the number of hits is meaningless, foolish, and a sure sign of incompetence. It is by striking hard, not by clever running, that victories have ever been won.

The question of the armament of the two 1911 battleships, shortly to be ordered, has just been examined by the Conseil Superieur de la Marine. The artillery authorities announced that all preliminary studies and experiments had been completed concerning the 340-mm. gun now in course of construction at the Ruelle factory, and that this new caliber could be fitted in the 1911 ships without entailing much delay, should the Admiralty decide to follow the example of England in discarding the 305-mm. type. Great divergence of views as to the advisability of the latter course was elicited. The partisans of the retention of the 12-inch weapon observed that in the matter of penetration at long range the 45-caliber guns of 305-mm. bore of the *Danton* class answer all present requirements, their 980-

pound shells being capable of piercing 370-mm. Krupp steel at 8000 meters (with an angle of 20° to the normal), and all existing armor belts at a range of some 10,000 meters. In the matter of rate of fire, the heavy guns of the *Dantons* were designed to shoot two rounds per minute, whilst 2.4 shots per minute were expected (with 400 kilo shells) from the improved 12-inch ordnance of the *Courbets*. To discard now so well studied and so efficient a weapon in favor of higher calibers would be to incur needless additional expense and delay, and to sacrifice volume of fire—an essential factor—for the sake of a useless increase in the penetration. It would be a thousand pities, added the staunch supporters of the 12-inch, not to complete a full division of four *Courbets* since this creation of Constructor Lyasse is certainly one of the most remarkable designs of "cuirassés" ever made for the French Navy, and has the merit of being ready in every detail; and if any extra gun power is judged necessary let it be sought in an increase of the armament of 12-inch weapons rather than in the adoption of heavier, more cumbrous, and less handy guns similar to those mounted in the British *Benbow* and *Inflexible* and in the Italian *Lepantos*, which had only an ephemeral existence. To this contention the partisans of progress answered by emphasizing the importance of the first blows, and by pointing out that in a duel between an *Orion* and a *Courbet* the British ship could hit first and with decisive effects, since there was no minimizing the superior destructive power of 600 kilo shells at extreme range. The *Courbets* (Nos. 3 and 4) could be made to carry, without much increase of their present displacement, 10 guns of 340 mm. (or eight of 370 mm.) on the center line. It is understood that no final decision was arrived at.—*Naval and Military Record*.

THE PROGRESS OF WAR MATERIAL IN 1910.—The war material of the great armies is at present in a stage of arrested development. The large orders given in 1909 for guns, rifles, and machine-guns are still in course of completion, and the leading makers are not inclined to favor developments which would render their new material obsolete before it is issued.

Field Artillery.—In the domain of field artillery the only new equipment which has appeared is the Montluçon "scissors trail" gun, invented by Colonel Deport. The gun is a 14.3-pounder, M. V., 1660 f. s., with hydropneumatic recoil gear of the ordinary French type. The novelty is confined to the lower carriage, which has a divided trail so constructed that the two halves can be opened out and nailed to the ground. This gives 60 degrees of traverse and 75 degrees of elevation, so that the gun can be pointed at any possible target on the ground or in the air without shifting the carriage. This gun has been successfully tried, and its mechanical action seems quite satisfactory; but it is an open question whether the tactical advantages gained are sufficient to compensate for the additional complication. The gun would be nearly useless for firing at balloons without special smoke-trail ammunition, which could not be carried without reducing the number of rounds available for ordinary purposes, and it would appear preferable to rely on special high-velocity guns for engaging balloons and aeroplanes.

The Armstrong 1909 76-mm. field gun, with compressed air running-up gear, has been slightly improved in 1910, and has achieved some very remarkable performances in the way of accurate shooting. This is no doubt due to a great extent to the ammunition, especially the shell, which has an ogive of four calibers. The introduction of these pointed shells, similar to the pointed rifle bullets now used, is only a matter of time. They have not been brought in for existing equipments, as this would involve scrapping the present stocks of ammunition and the present limbers and wagons.

The only new field howitzer which has appeared is the American weapon, which is on the variable recoil system. The valves of the buffer piston are controlled so as to give different lengths of recoil at low, medium and

high elevations. This affords a long recoil and steady carriage when the howitzer is fired point blank, while at high elevations the recoil is shortened to prevent the breech from striking the ground.

Mountain and Balloon Guns.—No new mountain gun has been brought out. The Russians have adopted the Schneider-Danglis gun, successfully tried in Greece in 1908. This gun is weighted with a loose jacket to reduce the recoil, and is a 14.3-pounder with M. V. of 1235 f. s. The French have at last completed the issue of the Ducrest mountain gun, which was introduced in 1906. This is a differential recoil gun, which is drawn back to the extreme recoil position before the first round and fired automatically during the run-up. It is hardly sufficiently powerful for modern requirements, being only a 10-pounder with M. V. 1075 f. s.

No great progress has been made in balloon guns, as it still appears doubtful whether dirigible balloons will be used in war on any extensive scale in the immediate future, and makers have received no orders except for a few experimental guns. A 75-mm. balloon gun mounted on a motor car appeared at the French maneuvers, but, this had only a traverse of 90 degrees, and appeared far inferior to the Krupp high-velocity 12-pounder on transportable platform, which still holds its own as the standard weapon. Vickers' Sons & Maxim have a new gun for the armament of dirigibles; this is a 6-pounder, with M. V. 1125 f. s., on pivot mounting with differential recoil gear, weighing 450 pounds complete.

The principal difficulty in the way of the development of the balloon gun is the provision of a fuse sufficiently sensitive to act upon the envelope. Messrs. Krupp have brought out three such fuses (British patents 11,617/09, 23,296/09, and 19,399/10). In these fuses the percussion action is exerted by a previously compressed spring, which is released on impact. The contact pin or trigger is locked by centrifugal bolts, which act in succession, so that it is not freed till the shell has travelled some distance from the muzzle. Thenceforward the contact pin is held in position against the air resistance by friction, which is not due to the close fit of the parts, but to the pressure against it of the segment-shaped centrifugal bolts. The friction can thus be definitely graduated so as just to hold the contact pin against the air resistance. One of these fuses has three triggers formed like the whiskers of a fish torpedo and connected by a serrated ring, which increases the resistance to penetration of the balloon envelope.

Ammunition.—The development of the universal artillery projectile is progressing slowly. The Ehrhardt universal shell has a separate head which forms a small high-explosive shell, while the bullets of the shrapnel portion are packed in trinitrotoluol, intended to explode only when detonated by the percussion fuse on impact. The Krupp universal shell—1910—is much the same as the Ehrhardt in principle; but the burster among the bullets consists of three layers of different grades of high explosive, which are said to render its action more certain.

For ordinary high-explosive shell Schneiders have brought out a safety fulminate fuse containing no less than 55 grains of fulminate, consolidated by heavy pressure. The fulminate is kept cool by a freezing mixture while being pressed. The compressed fulminate is as hard as marble, and is claimed to be absolutely safe.

Heavy projectiles for coast defence and siege guns are now mostly made of "electric" steel, smelted in the Girod electric furnace. Messrs. Krupp have installed five 15-ton furnaces of this type. The Girod process gives homogeneous metal of definite composition, remarkably free from blowholes. Shells of 6-inch caliber and upwards are now fitted with long pointed caps, intended to reduce the air resistance and increase the striking velocity, on the same principle as the pointed rifle bullet.

Machine Guns and Small Arms.—Great activity has been manifest in the manufacture of machine guns, but no new pattern has appeared. The two existing types are the Maxim, with recoiling barrel, and the Hotchkiss, in which the mechanism is actuated by a small portion of the gases admitted

to a power-cylinder at each shot. All others are modifications of one or the other of these types. Numerous forms of radiator have been devised to keep the barrel cool in place of the inconvenient water-jacket. The improvements have been in the direction of providing air passages in the radiators, through which a natural or forced circulation of air is maintained. In other types attempts have been made to combine radiation and water cooling. But a fully satisfactory barrel cooler has yet to be invented. The Austrians have adopted nickel-plated cartridges coated with graphite for their machine gun; these feed smoothly and are not liable to jam.

There are no novelties in small-arms worth recording. The French are experimenting with various patterns of automatic rifle with a view to rearmament. The specification issued by the French government was given in *The Engineer* of March 25, 1910. The Germans are considering the question of increasing the weight of their pointed bullet from 10 grammes to 11 grammes, in order to obtain more accurate shooting at medium ranges. The Mexicans have converted their magazine rifle to the automatic system, and the Swiss have re-armed with a new 2.95-inch magazine rifle, firing a pointed bullet of 175 grains with M. V. 2707 f. s.

Field Wireless Telegraphy.—In field wireless telegraphy, experiments are being made with the object of directing the waves, so that they can be prevented from reaching the enemy. The Bellini-Tosi system of directive wireless has been satisfactorily tried in America. It consists of two partly-closed triangular antennæ in vertical planes at right angles to each other, having at the intersection of their horizontal bases a radio-goniometer, which consists of two fixed coils and a third coil which can be pointed in any direction. This apparatus was found to be capable of directing signals with great accuracy. It has also the advantage of eliminating earth-currents; but the signals are enfeebled by the use of the radio-goniometer, and the effective range is only one-fourth of the normal for the same height of mast. However, it appears that there will be no practical difficulty in carrying a mast sufficiently high to give a fifty-mile radius of action, which is sufficient for ordinary military purposes.

Fortifications.—Land fortifications have been pushed on in most countries on the Continent, especially in Italy and Belgium. The Cockerill armored turrets employed in the Antwerp defences have been described in *The Engineer* of July 29, 1910. The fortifications at the mouths of the Panama Canal have been commenced, but will not be completed till the Canal is opened in 1915. The armament is to include ten 14-inch guns, twenty-eight new 12-inch howitzers, and a number of 6-inch and smaller calibers. The 12-inch howitzer is a formidable weapon, firing a 700-pound shell, with a range of nearly 10 miles.

From a business point of view, trade in land armaments has been unusually dull during 1910, with the sole exception of machine guns, and there is no present prospect of improvement. The money available for war material is being spent on naval armaments.—*The Engineer.*

SAFETY OF THE NAVY.—The following extract from a debate in the House of Lords on June 6, 1810, is perhaps one of the earliest references to the torpedo as an instrument of naval warfare:

"Earl Stanhope rose to submit a motion to their Lordships, which he thought related to a subject of more importance than any set of motions that had been before them for a very considerable time past, as it related to that on which the very existence of the nation depended, the British Navy. He had some years ago called their attention to this subject, on which he should now speak plainly, as a man of science would speak, and not like those who bamboozled people with mysteries, and involved everything in hard words and terms from the schools. He would make every noble Peer understand him. His Lordship then adverted to the experiments tried some years back off the French coast, and since then in

America, by a Mr. Fulton, for the ascertaining of a mischievous and horrid mode of destroying vessels of any size while floating in the water. He went through the history of these terrible inventions, which operated either by a line thrown into the water, which, meeting the ship, gave the opportunity to the machine to cling to the vessel, upon which the destructive explosion of gunpowder took place, which absolutely would cut any vessel in two (the proof of which had been made some years back in Walmer Roads); or by the immersion of a machine with a trigger which, when pulled, answered the same purpose; or by throwing an engine for the same purpose on a vessel. This person was invited over here, and his Lordship had seen an engagement between him and Mr. Pitt and Lord Melville, signed by them, agreeing in certain events to give him £40,000 and so on, to an immense amount. After the failure of a trial at Boulogne his claim was referred to certain scientific umpires, who awarded him £15,000; since that he had made his experiments in America, where both Jefferson and Madison were present, and had been voted $5000. His Lordship was led, at the present moment particularly, to this motion by a pamphlet he had just received from America containing the particulars, with plates, illustrative of the nature and effects of the invention. He then entered into a very scientific discussion and exposition of the theory of fluids, and the principles on which the machine acted, and stated that there were means in our power to counteract its dreadful effects, some of which he pointed out. There was also another and more ingenious invention for a more difficult object, namely, the cutting of the cables of blockading vessels when lying off a lee shore; what he wanted to know was this: as the subject had been looked on already as so important by great men, and by men of science, what had been done by government in the way of providing a remedy, and to what extent? For the purpose of ascertaining this, he had framed a motion, which he read; desiring an account of the measures taken to counteract the effects of these submarine carcasses and explosions, and of the *torpedo* triggers, &c., &c.

"The question was put, when his Lordship demanded a division, on which the numbers were: Non-content, 25; content, 8; majority against the motion, 17."—*London Times.*

After many experiments and much hesitation, Germany has definitely adopted torpedo defence nets for her battleships and armored cruisers.

Messrs. Whitehead & Co. have given out a statement correcting certain published data concerning their new 45-cm. torpedo. They state that this torpedo has speeds of 29, 34 and 40 knots for 3000, 2000 and 1000 meters, respectively, these speeds being guaranteed in their latest contracts and being actually exceeded. The dispersion is guaranteed not to exceed 6 meters at 1000 meters range, 15 meters at 2000 meters range, and 25 meters at 3000 meters range.

THE "PURITAN" EXPERIMENT.—The following statement has been made by the United States Naval Bureau of Ordnance concerning the high explosive test against the *Puritan* on November 25:

1. The test of high explosive charges against the side and turret armor of the *Puritan* was made in accordance with a provision that such an attack should be made against an actual ship, and specified both the character of the explosive to be used and the weight of the charges.

2. The explosive was that known as "explosive gelatine," well known as the most powerful of all the nitro-glycerine compounds used for military or blasting purposes, and one of the most sensitive of such compounds. The charge was in each case 200 pounds, which is believed to be the largest charge of this explosive ever detonated.

3. The *Puritan* was selected for the test because, although much weaker in resisting power than a modern battleship, she was perfectly available

and was considered to present more favorable all-round conditions for the test than any other ship which could wisely be used at this time, it being recognized that a test so extreme as this one could not fail to result in damages serious enough to call for repairs which might cover considerable time. The turret armor of the *Puritan* has a thickness of 8 inches, as against 12 and 14 inches in battleships of latest design, and the side armor at the point attacked was 10 inches thick, tapering to five inches at the lower edge of the belt. The *Puritan's* belt armor extends only about 3 feet below the normal water-line, and only 2½ feet below the existing water-line at the time of the test.

4. The explosion against the turret armor set back the plate against which the charge was placed, dishing it considerably and opening a number of deep cracks, some of which probably extend through the plate. The seams between this and adjoining plates were opened as were also those between the next two plates. It is not known whether the turret can be framed, as the test of this point could not be made until certain plates which had been inserted between the turret and the barbette shall have been removed after the return of the ship to the navy yard, but no pipes or joints in the mechanism were disturbed, and there was no evidence inside the turret of any disturbance whatever. Two chickens and a cat, which had been placed in the turret at points where the crew would be stationed for working the guns were entirely uninjured.

5. With regard to this test, it may be said that, as far as is apparent at the present time, the turret was not in any sense vitally damaged.

6. The second charge, against the armor belt, buckled the plate against which the attack was directed, swinging the ends of the plate outward and opening up the seams at the ends. The lower edge of the plate was also buckled outward, opening up a longitudinal seam below water, and starting a bad leak through which the water-tight compartment affected was rapidly flooded. It is impossible to say what damage was done below the armor belt, but there is no indication that this was serious. The narrowness of the armor plate undoubtedly contributed very largely to the result produced. The wider plates of a battleship's belt would have resisted buckling more effectually, and the longitudinal bulkhead, which exists in all modern ships, would have confined the flooding within narrow limits. As a result of the leaks, which in the *Puritan* gave free access of water to the whole of a large compartment running entirely across the ship, the stern of the ship settled about 12 inches, and at low water seemed to touch bottom, the depth of the water being only one foot in excess of the draft of the ship. With a rising tide the ship floated, showing that the reserve buoyancy of the after compartments was ample for taking care of the leak.

MARINE ENGINEERING.

THE FIRST GAS-DRIVEN CARGO VESSEL.—Arrangements have been made for the launching, on February 16, from the shipbuilding yard of J. T. Eltringham & Co., of South Shields, of the ship *Holzapfel I*, which, upon completion, will rank as the first sea-going gas-driven cargo vessel. *Holzapfel I* is being built for the Holzapfel Marine Power Syndicate, Limited, of London. She is 120 feet long between perpendiculars, 22 feet beam, by 11 feet 6 inches moulded, and is intended to carry a little over 300 tons deadweight on a draft of 10 feet.

A set of high-speed six-cylinder vertical gas engines, manufactured by E. S. Hindley & Sons, of Bourton, Dorset, will be placed aft. They will have double ignition, and give 180 brake horse-power at 450 revolutions per minute. The gas plant is in duplicate, each division being of 100 horse-power, and it is being constructed by the Power-Gas Corporation, of Stockton-on-Tees. The producers are square in section and will stand side by side on the port side of the vessel, with their faces to the engine-room. The scrubbers will stand forward of the producers, and are about

13 feet high, the upper portion being the wet cooler and the lower portion the dry scrubber. Both producers and scrubbers are enclosed in a gas-tight compartment separated from the engine-room, and furnished with two 12-inch ventilators.

The power of the gas engine will be transmitted to the propeller shaft by means of a "Föttinger" transformer, which, as an intermediary between the gas engine and the propeller shaft, reduces the revolutions of the latter to any desired number, within certain limits, while the gas engine is working at full speed. It can also stop or reverse while the gas engine is running at full speed ahead. Its action is practically instantaneous. The loss of power entailed by its use varies from 3 per cent to 20 per cent, according to size, and to the gear or ratio of the number of revolutions of the prime mover to the number of those of the propeller shaft. A favorable ratio is from 300 revolutions of the prime mover to about 100 revolutions of the propeller shaft, and this, in general practice, permits a high-speed gas engine of light weight and low first cost to be used with a propeller of high efficiency. The "Föttinger" transformer is, in effect, a hydraulic clutch, and consists of a centrifugal pump delivering water into a turbine. There are two turbines, one driving ahead, the other astern. The water is conveyed to them through a reversing valve actuated by a hand lever, and when this lever is in its middle position the gas engine continues to revolve without driving the propeller. The engine always runs in the same direction whether the propeller is going ahead or astern. In *Holzapfel I* the transformer is geared from 450 revolutions of the gas engine to 120 revolutions per minute of the propeller. The transformer, together with the thrust block, is coupled direct to the engine, and the two occupy a total length of about 20 feet.

The vessel has a donkey boiler, 5 feet diameter and 8 feet 6 inches high, and two steam winches, each of 2 tons capacity. The donkey boiler and its coal bunker are placed on the starboard side, and they together about counterbalance the weight of the gas plant. The bunker supplying the gas producer is in the poop, and will contain about 12 tons. It will feed into the hoppers of the two producers, and very little trimming will be required. It is expected that the consumption of anthracite coal will be from 25 cwt. to 30 cwt. daily, as against 3½ tons of steam coal for compound engines of equal power, such as are generally used for vessels of this size. An air compressor and air cylinders will be fitted for starting the gas engines. When the vessel is about to get under way, the engines will be set going and the lever regulating the transformer will stand at "stop." During the slow speeds and stoppages the engines will remain in motion, the transformer giving the power to the propeller shaft only when required. The blowing on of the gas producers while they are being lighted up will be effected by an arrangement of air injectors supplied from the compressed air cylinders.

Holzapfel I being only a small vessel and intended for short voyages—chiefly for carrying coals from South Wales ports—will not be fitted with an evaporator for supplying fresh water to the vaporizers of the producers, but the fresh water necessary for this purpose will be carried in the after peak tank, and the steam winches will exhaust into this tank to augment the supply. The hull, engines, and gas plant will have the highest class at Lloyd's Register, and 7½ knots will represent the vessel's average speed.—*The Engineer.*

AN OCEAN-GOING OIL-ENGINE SHIP.—Considerable interest has been awakened in engineering and shipbuilding circles on the *Clyde* through the intimation made by Mr. Russell Ferguson, managing director of Barclay, Curle & Co., engineers and shipbuilders, Whiteinch and Finnieston, that his firm were laying down a vessel of about 5000 tons for foreign owners, the propulsive machinery of which would consist of oil engines of the Diesel type driving twin screws and designed to give the vessel a speed of

12 knots. This intimation was made on the occasion of a complimentary dinner given on Feb. 3, in honor of Mr. Jas. Gilchrist, chairman of the firm, in celebration of the jubilee of his connection with the company; and although the keel of the vessel is not yet laid, the construction of the engines has actually been commenced in the company's engine works at Finnieston. This new vessel, the first on the Clyde to be fitted with internal combustion engines of any size, is for foreign owners, and she is to be about 5000 tons gross and 7000 tons deadweight capacity, while accommodation is also to be provided for a limited number of passengers. In addition to the main propelling engines, there will be another smaller engine of the same type for providing power to generate electricity for driving the winches, windlass, and steering gear, as well as for lighting the vessel. The advantage of the Diesel engine, Mr. Ferguson said, was that it could be worked with the cheapest kind of oil, which could be bought at present for from 34s. to 40s. per ton. There was no magneto or spark required to ignite the charge, this being done by compression, while the engines could be started in five minutes, as compared with fifteen hours required to raise steam with boilers. There were no boilers, no funnels, and no coal bunkers, the oil being carried in specially constructed tanks.—*The Engineer.*

DEVELOPMENTS IN MARINE PROPULSION.—We are at the present time passing through a transition stage in the development of marine engineering which can hardly fail to make history. It seems a very short time since the last word appeared to have been spoken, and a definite limit reached, in the perfection to which reciprocating engine practice could be brought. Multiple-expansion, surface-condensing, superheating, and steam jacketing had all played their several parts in this, and further possible improvement had apparently been reduced to small proportions. The adoption of water-tube boilers, and to a small extent the use of oil fuel, brought about some further increase of efficiency from the fuel consumption and weight carrying point of view, but no serious claim to any large improvement could be made. With the epoch-making introduction of the steam turbine, however, a great advance was effected, and its extremely rapid growth is ample proof of the wide recognition accorded to the successful application of the rotary principle. The next step was the interposition of a steam turbine, between the exhaust of an ordinary reciprocating engine, and the condenser; a greater expansion of the steam being thereby obtained than is possible with reciprocating engines alone. The result was a combination engine, in which the exhausts from two reciprocating engines, driving wing shafts, were brought to a common turbine of large size working at low pressure and driving a center shaft as in the *Otaki, Rotorua,* and *Laurentic,* not to mention the *Olympic* and *Titanic.* A great increase of steam efficiency was obtained by this method.

The great difficulty associated with the application of the Parsons expansion turbine to the propeller shaft directly is that of high revolutions, involving a loss of efficiency at the propellers. Strenuous endeavors are being made to obtain an efficient and reliable means of gearing down the propeller shaft, which shall permit of lower propeller speeds being used. Mr. Parsons' experiment on the *Vespasian,* with direct gearing, has met with much success, and he is now supplying two sets of geared turbines to the Admiralty for torpedo-boat destroyers being built on the *Clyde.* The same effect is obtained by Dr. Föttinger's hydraulic gearing, which is being fitted to a steamer now under construction on the East Coast for foreign owners. An interesting feature of this design is that the water, which is heated by the transmission of so much power, is used to augment the heat of the feed. The performances of these vessels will be watched with great interest. On the other hand, by using a combination of the impulse and expansion turbines a lower speed of revolution is possible, as in the Curtis-Brown installation of H. M. S. *Bristol* and the A. E. G.

German turbine engine, and it is thus hoped to regain the loss of propeller efficiency hitherto sustained with turbine engines.

In the meantime, another school of engineering thought is devoting itself to exploitation of the internal combustion engine as the ideal marine motor. For very small sizes, engines, using light spirits hold the field. For larger dimensions opinions are divided between gas engines and engines using crude oils. The invention of producer gas plant has made it possible to consider gas engines, driving propeller shafts directly, as serious competitors in the race. Experiments on quite a large scale have been made, not, however, with altogether convincing results. An interesting case of producer gas propulsion is afforded by a vessel approaching completion at Dumbarton. This is a 53-foot steel yacht, built for Mr. H. A. Mavor, of Glasgow. A gas engine using producer gas drives a dynamo, or generator, which in turn supplies power to an electric motor directly connected to the propeller shaft. The revolutions are thus brought down to about 350 per minute, with which speed a good propeller efficiency should be attainable. This little vessel represents generally the suggested application of electricity to the problem of marine propulsion.

Of more serious import, however, is the rapid development taking place in the growth of the oil engine proper. Until quite recently, the introduction of comparatively small powers for fishing boats has attracted most attention. But now the constant pressure or Diesel type engine is rapidly making the development of large powers from crude oils possible in marine engines. So far as our own columns have shown, this engine has received more attention abroad than at home. But there is now to be built on the Clyde, at Messrs. Barclay, Curle & Co.'s shipyard, a vessel of 7000 tons deadweight—very much greater than anything yet attempted—for which the builders are constructing at their engine works two sets of large internal combustion engines of the Diesel type. The vessel is to have twin screws, which are expected to give her a speed of 12 knots. The provision for starting and stopping, and for reversing rapidly, with other minor details, which were successfully developed in the experimental vessels of smaller size, are all being incorporated in the larger vessel. Another interesting feature about this vessel is the manner in which the auxiliaries are to be worked. Hitherto steam has been generally deemed necessary, but in this case a smaller engine of the Diesel type will generate electric power for the winches, windlass, and steering gear, and provide electric light for the vessel. The ship, it is reported, will have no funnels, the intention being presumably to discharge the products of combustion at the water level. In this, if the intention is carried out, she will differ from preceding Diesel engine ships, in which the use of a funnel has been found at least desirable. Specially constructed oil tanks will take the place of coal bunkers; the usual boiler space will be available for cargo; and the oil space will only be about one-fourth of that which would be necessary for a coal-propelled vessel of the same dimensions and speed. The crude oil, on which this engine may be worked, can be obtained for about 35s. to 40s. per ton, and it is estimated by the builders that 100 tons of oil will take the vessel as far as a similar ship would be taken for the combustion of 300 tons of coal. The ship is for foreign owners, although being built by a British firm.

Never, perhaps, has there been such a diversity of new departures in marine engineering within a short time as has been recently seen, and we are safe in saying that some, if not all, of these will make history. A satisfactory reflection is the thought that British engineers are still in the van when practical application of new movements is in question.—*The Engineer.*

MECHANICAL STOKING.—Experiments are being carried out on board the British tug *Prudent* with a mechanical stoker. The coal is placed in a hopper and then distributed over the furnaces. It is claimed that the

invention secures a more equal distribution of the fuel. The trials have not yet been exhaustive enough to prove whether the invention is likely to be of great service in ships of the Royal Navy.

TURBINES IN FOREIGN NAVIES.—It was certainly not without a good deal of surprise that the announcement was received concerning the engines of the new American battleships. As is now well known, they are to be of reciprocating type, and apparently, for a period at least, the use of the turbine has been abandoned. The reason given is the presumed more economical working of the reciprocating engine at certain speeds. The Germans are not moved by this consideration. Lathes for the largest turbines now exist at their shipyards, and stations are being built at Hamburg and elsewhere for the testing of turbines at full power before they are placed on board. Great advantage is expected to result from this procedure. The French are employing turbines in all their new ships, but there have been many difficulties, and the blading seems in some cases to have been defective. From this cause, it is believed—though some seem to think the damage has been wilful—faults developed in the turbines of the battleship *Voltaire*, and the destroyers *Cavalier* and *Chasseur*. Be this as it may, considerable repairs have become necessary.—*Army and Navy Gazette.*

MOTOR-DRIVEN WARSHIPS.—*The Essential Facts.*—There is no reason for supposing that any battleships or armored cruisers of the British program for the current financial year will be fitted with internal combustion engines, says the *Engineering Supplement of The Times*. Contracts have been already made for Parsons turbines in all four battleships of that program, and the large cruiser yet to be ordered, it is practically certain, will be equipped similarly. In regard to next year's program we shall know in due time, and must "wait and see." It is hardly credible, however, that such a gigantic experiment as has been suggested will be made next year. The Engineer-in-Chief of the Navy and his staff have shown great courage and resource in facing many new problems, but they have also never failed to exercise a wise discretion and to take due precautions when making new departures. They undoubtedly possess full knowledge of the considerable advances which have been made of late with internal combustion engines of the Diesel and other types both at home and abroad, and they have gained considerable experience with such engines when employed in auxiliary services on board large ships of the Royal Navy or for propelling small vessels. That experience, valuable as it is, will hardly lead to an advance, at a single step, to the machinery for a motor battleship of 36,000 horse-power. In Germany, according to information of a trustworthy nature, a large-scale experiment is in progress, with support from the government.

The following are believed to be the essential facts: Three sets of motor machinery, each set containing three cylinders, are being manufactured, the aggregate power being about 18,000 horse-power, and the maximum power per cylinder about 2000 horse-power. Exhaustive trials are to be made on shore with a representative set of about 6000 horse-power. If the results are satisfactory, it is proposed to fit the three sets in a vessel of the "protected cruiser" type, and to use the motors to drive triple propeller shafts and screws, in place of three sets of reciprocating steam engines which were used prior to the introduction of turbines into vessels of the same class. The internal combustion engines are said to be of the Diesel reversible type, and the principal novelty is the considerable advance made in the power to be developed in each cylinder. This feature is unavoidably experimental; if it proves a success the accompanying advantages in regard to weight and space, as well as the disuse of boilers and the economy of oil-fuel as compared with coal, will be very considerable. It may be taken for granted that those who are responsible for the experi-

ment will avoid risks as far as possible; but they are proceeding on reasonable lines, and it has been stated that the vessel in which the sea trials will be conducted, if the shore trials realize expectations, could be equipped with steam turbines and boilers in case the motor experiment should not prove successful. This is obviously a reasonable and proper mode of procedure in the circumstances.

THE STEAM TURBINE IN GERMANY.—*A Discussion of the Growing Tendency to Merge the Different Systems into One Standard Type.*—Both in America and in Europe the most important of recent developments in steam-turbine design seem to be in the direction of the evolution of a general standard type embodying the best features of all existing systems. The merging of systems has progressed less rapidly in America than it has in Europe, but the tendency towards standardization is already well marked. Thus, for some of the Westinghouse turbines, the American representatives of the Parsons type, the double-runner velocity stage of the Curtis system has been adopted for the initial expansion, while it is reported that the General Electric Company, the builders of the Curtis turbine, have built some units in which the Parsons system is used for the final stages.

The progress of standardization in Germany, where it is perhaps most apparent, is described by F. E. Junge and E. Heinrich in *Power* for November 8. "It is an acknowledged fact that the development of steam-turbine construction, after having acquired a high degree of thermal excellence, tends now toward a standardization of the different systems, which at present are dominated and characterized by a few simple principles of steam flow and structure. The following discussion of these principles will be confined merely to axial turbines, because the radial turbine has not so far shown an equal capability of development, at least for purposes of large-scale power production.

"First. The many-stage reaction principle developed by C. A. Parsons. As regards the utilization of steam energy this system is characterized by the fact that the conversion of the potential energy of the steam into kinetic energy takes place not only in the guide-blade channels, but also in those of the rotating part. Regarding construction, the Parsons system is characterized by the use of a drum with dummy pistons and labyrinth packing.

"Second. The many-stage action principle with one row of blades on each rotating wheel, developed by Rateau and modified by Zoelly. As regards the utilization of steam energy this system is characterized by the fact that the conversion of the potential steam energy into kinetic energy takes place in the guiding apparatus only, while the whole kinetic energy of a stage is utilized in a single row of rotating blades. Regarding construction, the Rateau-Zoelly system is characterized by the employment of several disk wheels and by the separation of the different stages through guide-wheel disks, which reach unto the hubs of the rotating wheels.

"Third. The many-stage action principle with velocity staging developed by Curtis. As regards the utilization of steam energy, this system is characterized by the fact that the whole potential energy of one stage is, as a rule, transposed into kinetic energy in expanding nozzles, and further, that the kinetic energy of each stage is utilized in several rows of revolving blades. Regarding construction, the Curtis system possesses rotating disk wheels, like No. 2, but fewer in number, which are equipped with several rows of blades; in addition, it possesses deviating blades which are fixed in the casing.

"The principle of one-stage action has not been included in the above. This system, as developed by De Laval, shows in its practical execution several remarkable solutions; for instance, the flexible shaft and the disk wheel with high peripheral velocity. But the very nature of the De Laval turbine, at least in its original form, militates against the attainment of

high capacities. The high peripheral velocity and the resulting high number of revolutions necessitate the employment of gears in order to get down to practicable speeds. Gears for high output have not, however, found favor in stationary practice. In the Riedler-Stumpf turbine the attempt was made to attain reasonable speeds by adopting very large wheel diameters and best material. But practice has evinced that buckets milled into the rim of the wheel would not stand the eroding action of the steam jet, and that the steam consumption increased very materially owing to the destruction of the sharp admission edges of the buckets.

"The three above-mentioned fundamental principles of steam-turbine construction have developed each for itself in Germany. Gradually, however, there has been a fusion of the different systems. For example, the A. E. G. has abandoned the Curtis construction of the low-pressure part of its 1500 revolutions per minute type and has adopted the principle of many-stage action as developed by Rateau and Zoelly. Up to this year the pure Curtis principle was followed in its 3000 revolutions per minute type, showing two pressure stages with two velocity stages each. The best known type of this class is the turbine of 1000-kilowatt capacity. But for outputs beyond 1000 kilowatts the A. E. G. now builds the low-pressure part after the Rateau-Zoelly principle. Evidently the cost of construction of the said type of 3000 revolutions per minute, which contains only two rotating wheels with two rows of buckets each and only one guide-wheel disk, is lower than the cost of a turbine of equal output which contains, besides a rotating wheel with two rows of buckets, from five to seven wheels with one row of buckets and the same number of guide-wheel disks. But the severe demand for a low steam-consumption guarantee, which would enable the firm successfully to compete with other German makes, forced the designer to adopt a somewhat more expensive construction. The Bergmann Electric Works build their turbine similarly, using a combination of the Curtis and Rateau principles.

"Even the foremost of the German firms representing the Parsons interests, Brown, Boveri & Co., have, after long hesitation, resolved to follow the example of other builders of reaction turbines. They have replaced the high-pressure stages of the Parsons turbine by a Curtis wheel, reducing the length and weight of the unit enormously. Only for large units and special-service conditions is the pure Parsons principle maintained. Last, but not least, the Curtis principle begins to intrude into the Zoelly syndicate, which, so far, has resisted with tenacity all attempts to change its original mode of construction. The Augsburg Nürnberg Works, members of the syndicate, have just begun to build all of their 3000 revolutions per minute types on a combination principle, using the Curtis and Zoelly features. The Görlitz Machine Works, licensees of Zoelly, have also built normal types of turbines in accordance with the above principle, but only for sizes below 700 kilowatts. The other members and licensees of the Zoelly syndicate have not adopted the new practice.

"Summing up it may be said that turbine construction tends toward the creation of a standard system of unity, which will include all of the best features of the different types. In the present stage of development the following variations exist: First, the combined Curtis and Rateau system; second, the combined Curtis and Parsons system; third, the pure Rateau-Zoelly system; fourth, the pure Parsons system; fifth, the pure Curtis system. The above order of importance has been arranged according to the influence which, in our notion, the various systems exercise upon the art of turbine building for stationary purposes in Germany to-day.—*F. E. Junge and E. Heinrich—Power.*

ENGINEERING PROGRESS IN 1910.—*British Naval Work.*—The Admiralty orders, as always, form a large percentage of the horse-power required from marine engineers. Much, if not all, of last year's program will, of course, find its way into the 1911 return; but it is consoling to reflect that after

the relative inactivity of 1909 no less than about 820,000 shaft horse-power has been ordered for the Royal Navy since January last, made up by two colonial cruisers, four "contingent" ships, and the ships of the 1910-1911 program, which include twenty torpedo-boat destroyers; this total is very great, but it appears likely to be eclipsed before long. A great step was made early in the year in fixing the individual horse-power of the *Lion* class cruisers at no less than 70,000—not far from double the designed power of the *Indomitable* class. The individual power of the battleships has risen to over 30,000 shaft horse-power, but the cruiser and destroyer classes show no increase over 1909. There are only two important ships that carried out trials last year—the battleship *Neptune* and the cruiser *Indefatigable*. Both ships did remarkably well; the gunnery trials being also extremely satisfactory. Several *Town* class cruisers have been passed into the fleet, and interesting comparative trial data was obtained from the Curtis turbine cruiser *Bristol* in relation to the four sister ships propelled by Parsons turbines. There was found to be a distinct gain in the efficiency of the propellers of the twin-screw boat compared with the four shaft Parsons vessels, which, however, was practically entirely neutralized by the superior thermal efficiency of the latter. The *Bristol* possesses an additional innovation in the shape of superheaters in the boiler uptakes. A repetition of the progressive Admiralty policy in appealing to the experience of private builders was forthcoming last year in the request made to certain firms to tender for "special" destroyers largely on the lines of the circulated specification for the 27-knot destroyers. As a result, orders for six vessels were placed, all of which embody many minor novelties in existing practice, which will thus have a fair trial under naval conditions without detriment to the value of the boats themselves. Thus two ordered at Dumbarton will have twin screws and geared turbines to drive them, while at least two others will embody a modified velocity compounded impulse turbine at the forward or high-pressure end. Rotary air pumps and turbine-driven fans find a place in another special design. As regards the year's practical steaming work, we have had some remarkable instances of reliability and durability from the *Dreadnought* classes, the experience of which has been most satisfactory. The destroyers, however, have experienced many minor troubles, which are not entirely free from criticism. There have been numerous cases of cruising turbines stripping and a few other less important troubles which are likely to be eradicated in the next classes of boat. The Admiralty design of destroyer has already been under trial. It will be remembered that the 1909 boats were not, as had been the case since the early *Hornet* class destroyers, contracted for on builders' designs but on Admiralty lines and scantlings. There is great credit due to them, and though the trials of the 1909 boats have revealed sundry points capable of improvement, the result is undoubtedly a distinct success. The work done by the submarines this year—by *D* 1 more especially—has been particularly good.

British Mercantile Work.—With the exception of the *Vespasian*, there has been little striking in marine engine work this year at home. One gigantic ship has been launched, the *Olympic*, in which the combined turbine and reciprocating engine system has been adopted. Another—the "New Cunarder," to use a phrase that became famous all over the world when speaking of the *Mauretania* and *Lusitania*—has been ordered but is barely commenced. A few Channel steamers, none of any striking importance, have been built; but merchant work generally, though vastly improved in quantity since 1909, has nothing striking to commend it in the past twelve months. The Orient Company and one or two other firms have ordered combined turbo-reciprocating sets, but it does not appear that the well proved economy of the *Otaki* is as yet thoroughly appreciated. Owners are looking more to the possibilities of the yet untried oil engine than to the proved certainty of previous steam experience. Trade in small Amazon river vessels has been distinctly brisk, largely due to the unpre-

pared state of some of the Amazon companies for the boom in rubber; the difficulty on this, as on other river sources, is the adequate protection of the propeller from floating obstructions or stationary obstacles. The uneconomical stern wheel seems the most reliable solution. On the Atlantic service the performnaces of the *Mauretania* deserve special mention. The most recent feat is crossing to New York and back in twelve days. The trips were run in abnormally heavy weather, and the high average speed attained was quite exceptional. We have known 700-foot 17-knot liners forced to lie to on account of stress of weather of far less apparent force. Two other magnificent liners of lesser speed are under construction for the Cunard Company.

Boilers.—There is no denying the fact that interest in steam generators is far less keen than it was ten or fifteen years ago. This is partly due to the boiler having been overshadowed to a large extent by the engine and propeller questions of recent years and partly to the greater reliability of the naval boiler, which type alone gave real cause for controversy, as the cylindrical boiler was of proved efficiency and durability for mercantile work long before the introduction of the water-tube type in the Royal Navy. There are, however, signs that in those classes of vessels wherein the boiler itself forms a large proportion of the total displacement—such as in fast cross-Channel steamers more especially—that the water-tube will be adopted. Naval experience in the last ten years with the Yarrow or Babcock boilers has been markedly free from the troubles due to design or workmanship such as characterized the earlier naval installations. There really exists no adequate reason against their more general adoption. It is stated in Germany that the two new Hamburg-American liners are to have water-tube boilers of the Schulz type, while there are also two channel steamers being built in the Clyde with this type. The attitude of the Registry Societies against water-tube boilers in insisting on unduly severe survey conditions has hitherto militated against their wider adoption, but with Admiralty experience as a guide there should have been no real necessity to discourage the water-tube boiler any longer. In naval work there is relatively little to record excepting an increased tendency to enforce a still stricter inspection of tubes—if such be possible—but the improved reliability is probably worth it. Superheating is still opposed, though for land turbine plants, where impulse rather than reaction turbines are adopted, there can be no doubt as to its value. As it is, only a few solitary naval vessels have been so fitted in the last year, and there is still no adequate experience gained as to their value.

In some quarters turbine-driven fans are advocated. These were tried in the United States, but some doubt exists as to their economy, though they absorb less space, and are more convenient to place on board ship than the reciprocating type. It is also possible that before long the "mushroom" type of ventilator, with a hinged top for fine weather use, will be more widely adopted. The large open cowl, however efficient it may be for catching air, is open to many objections.

Marine Engines.—Of marine engines, or turbines *per se*, there has been little development of great interest. The triple or quadruple expansion reciprocating engine still holds its own; though the Parsons turbine, built and building, exceeds 5,000,000 shaft horse-power, practically all of the same general type. Improvements in auxiliary machinery have been relatively small. The Weir condensing plant has been found of great service in Admiralty as well as mercantile circles, and is by far the most widely adopted at the present day. Rotary air pumps find favor abroad, but have hardly been introduced into this country. In details of construction, there have been distinct improvements in the quality of materials, especially for propeller, and in high tensile bronze castings for steam fittings or boiler materials, but British makers still seem unable to provide the high quality of steel casting that can be purchased on the Continent or in the United States. Iron castings have been none too good in many cases during the

last two years, and foundry work all round seems capable of improvement. The actual thermal efficiencies attained during the year have been very good. The steam consumption of the *Town* class cruisers especially was very low, and in some of the recent large reciprocating engined ships it has been reduced by greater attention to feed-heating, by the use of auxiliary exhaust and better condensing plant.

Geared Turbines.—The adoption of mechanically geared turbines for marine work was first shown to be a practical proposition early in the year, though elaborate experimental results on large steam turbines driving slow-running secondary shafts by means of helical gearing were published eighteen months ago by the Westinghouse Machine Company of Pittsburg. At the meeting of the Institution of Naval Architects in March, 1910, the Hon. C. A. Parsons read a paper describing an application of mechanical gearing to merchant ships of slow speed as carried out by the Parsons Marine Steam Turbine Company. In this he gave very full particulars of the details of the installation, together with the comparative results obtained with the original engines and with the geared turbine system by which it was supplanted. The success of the very practical experiment thus made was most striking. The cargo vessel *Vespasian*, of 275 feet length and 5400 tons displacement, was purchased, and her machinery very thoroughly renovated and overhauled prior to a thorough series of tests being conducted to obtain reliable measurements of coal and water consumption, not only on progressive speed trials, but also in service. On the completion of a voyage to Malta and back the triple-expansion engine was taken out, and a geared turbine system applied in its place to the original shaft and propeller, after which the second series of trials took place under corresponding conditions. The saving in weight by adopting the turbine was 25 tons; the engine and its condenser weighed 100 tons, and the installation of turbines, condenser and gearing only 75 tons. The saving in steam consumption at 10 knots—the water was carefully measured in tanks—was practically 15 per cent. Such a result would be remarkable, even if it were only a temporary saving, but the improved economy has been maintained without any deterioration on numerous subsequent voyages to continental ports. For the same coal consumption the speed was materially increased.

The *Vespasian* represents a very common type of cargo steamer. She is only 1100 horse-power, and the applicability of direct-driven turbines to ships of such low speed had long been recognized as impracticable. Mechanical gearing had also long been discussed as a possible solution; but even after the Westinghouse trials, wherein a 98.5 per cent efficiency of transmission was attained with 6000 horse-power, there still remained—until Mr. Parsons actually conducted his trials—considerable doubt as to its efficiency and durability. The service trips of the *Vespasian* have confirmed this latter quality. It is difficult to understand, therefore, why more has not been heard of geared turbines. There are two or three destroyers being built for the Admiralty in which gearing is to be adopted, but nothing more. Builders, we believe, receive far more inquiries for oil engines which incidentally remain relatively untried than they do for geared turbines. Some people urge that the gearing is noisy, which is quite incorrect, while others continue to doubt the reliability of the gearing. The first is a frivolous objection, while, as to the other, those few whom the *Vespasian's* record has failed to convince have possibly given the subject inadequate attention in other branches of engineering—motor cars or rolling mills, for example.

Similarly, as regards the hydraulic gear of Dr. Föttinger, there has been, since the trial of the experimental launch, only one small vessel commenced. The Föttinger gear possesses the advantage of reversibility, but, on the other hand, reduces shaft efficiency. Even so its silence and the remarkable smoothness of its operation strongly commend it, and there is no doubt that even with its 85 per cent efficiency its use with turbines would

effect great economy over reciprocating engine vessels. For vessels in which gas engines are applicable the Föttinger gear admits both of speed reduction and reversibility, and early next year we may expect to hear of the trial results of the vessel now being built on the Tyne with such an installation. Of electric gearing practically nothing except paper proposals has been heard.

INTERNAL COMBUSTION ENGINES.—Probably relatively less of the petrol or producer gas engine has been heard during the past twelve months than of the oil engine, which has apparently made remarkable progress in the last two years on the Continent. Much has been done in this country with motor boats of the hydroplane type—*Pioneer*, *Miranda*, etc.—but these are all fitted with very high speed engines, in spite of their great power, and petrol-driven moreover. The German firms have made, together with the Belgians and the Swiss and Dutch, great strides in oil engine work, and there are several vessels under construction abroad with Diesel engines. No unanimity as to type seems to have been arrived at, and whilst the two-cycle engine is in greatest favor, the four-cycle is yet very well holding its own. Reversibility and elasticity over a big range of power are the two most formidable difficulties to be contended with, but the cost of construction is also very high. Reliability equal with that of the steam engine has yet to be proved, and the geared turbine hovers in the background as a well-proved and reliable rival. In fact, even for auxiliary work, such as dynamo engines, where a reliable oil engine would obviate the use of an auxiliary boiler, air-pump, and feed pump, oil engines are not yet adequately trustworthy. Until they have given proof of their quality, it is absurd to consider their adoption for the largest powers as imminent. The great gain in economy by their use, however, is directing attention to them from all over the world, and many developments may be expected at no distant date. To suggest battleship or destroyer propelling machinery of this type is as yet absurd; the *rôle* of the oil engine is far more likely to be in tramp steamer propulsion, commencing at 1200 or 1500 horse-power.

One of the most important vessels yet completed is the oil-tank ship *Vulcanus*, built and engined by the Nederlandsche Fabriek at Amsterdam. It has a six-cylinder, four-cycle, reversible Diesel engine developing about 500 shaft horse-power. As it is intended to make ocean voyages its progress, as the pioneer in such work, will be watched with the closest interest. A twin-screw vessel is being built now by Blohm & Voss, and in due course will be fitted with two three-cylinder, double-acting, two-cycle Diesel engines. A peculiarity about this engine will be that the piston and rod will be cooled by oil circulation. In the *Vulcanus* they are cooled by air. Schneiders have also taken up the manufacture of marine Diesel engines, and are fitting a big five-masted French sailing vessel with a twin set of four-cylinder, two-cycle engines, each of which will develop about 1000 horse-power, and will together give the vessel a speed of 9½ knots. Burmeister & Wain, of Copenhagen, are also building marine sets of large power, and the Augsberg-Nurnberg have several large reversing engines now under test. They are single-acting two-cycle with six cylinders. At John Cockerill's works a Diesel marine engine, which is particularly interesting because it is capable of running at very low speeds, is being constructed. It has six cylinders on one crank shaft, but the shaft is divided at its center by a clutch. For full speed the clutch is engaged and all cylinders work. For slow speed or reversing the clutch is disengaged and the forward three cylinders drive an air compressor, which supplies air to the aft three cylinders, which then run on compressed air only. A great range of speed is thus made available.

In this country there is comparatively little progress in this direction, but we understand that Richardsons, Westgarth & Co. are taking up the manufacture of marine engines of the Diesel type.

Marine Engineering Abroad.—There have been several important developments abroad, especially in Germany, where the two big Hamburg-American liners have been ordered, the trials of the armored cruiser *Von der Tann*, of 80,000 developed shaft horse-power, have taken place, and the introduction of oil-engined sea-going ships commenced. The two first-named vessels—both to be built at Hamburg by the Vulcan Company, and Blohm & Voss—are of about 80,000 shaft horse-power, and nearly 60,000 tons displacement. The *Von der Tann* is the first German *Dreadnought* type cruiser, and though severely forced on trial she indicated a high degree of economy and attained a mean speed of 27.4 knots.

In France the trials of the first turbined-engined *Dreadnoughts* have taken place, though a severe case of blade stripping on the first steam trial severely upset the equanimity of the Admiralty engineers, especially as there have also been sundry cases in the destroyers. The new Messagerie American liner *La France* was satisfactorily launched at St. Nazaire in October.

In the United States there has been little of great interest. The three experimental scout cruisers still continue to run comparative trials, but valuable information of a similar nature is available from the performances of the battleships *Delaware* and *North Dakota*. An interesting case of re-engining a turbine ship with twin-screw reciprocating engines has recently occurred. This was the first Curtis turbine vessel *Creole*, whose speed and power was never such as to attract a turbine engineer. That ordinary engines improved her performance occasioned no surprise.

Wireless Telegraphy.—Wireless telegraphy has made considerable advances. The Marconi Wireless Telegraph Company state that Mr. Marconi, while at Buenos Aires, received wireless telegrams from the Marconi station at Clifden, Ireland, and also from Glace Bay, Nova Scotia. These were classes of direct transmission, over some 6000 miles. The European station at Coltano, in Italy, is now practically complete. Experiments have taken place on the Continent with apparatus on the Zeppelin airship, and it is said that communication was effected up to 372 miles distance, with only 700 watts of energy. The German Colonial Company of Berlin consider that a system of wireless telegraphy can be instituted between Nauen, near Berlin, and the German Cameroons Colony, 3410 miles apart, provided that a station the size of that at Nauen be erected in the colony. The Zeppelin Airship Company has carried out some experiments, using the new Telefunken singing spark system, and have received messages up to at least 32 miles from the Nauen station. The metallic frame of the airship is found advantageous. A station has been erected in the Crystal Palace grounds based upon Mr. Sharman's patents. The received signals are of a musical character, and the sparking apparatus is comparatively silent. The first Marconi station on the South African coast has recently been established on the Bluff at Durban. It is a 3-kilowatt station, with a guaranteed minimum range of 250 miles, but under very favorable conditions communication was effected at a distance of 1050 miles. It has even been installed in three of the Cuxhaven steam fishing trawlers, and has enabled these vessels to communicate with the German ports. Experiments have been made to obtain wireless communication with submarines. Messages have been received by submarines, but as yet not transmitted from them.—*The Engineer.*

MISCELLANEOUS.

COALING WARSHIPS—NOTES OF PROGRESS. (By Spencer Miller.) Abstract. Read at the 18th annual meeting of the Society of Naval Architects and Marine Engineers.—One of the United States colliers (purchased during the Spanish-American war) discharged with its own gear from its four hatches 1200 tons of coal in ten hours, 120 tons per hour, or 30 tons per hour per hatch. About 100 men were required to fill the coal bags in the hold. For a single hour 50 tons of coal per hatch may be discharged.

In contrast to this the United States Navy collier *Hector* discharged 190 tons of coal from one hatch in one hour, employing a self-filling bucket operated by two men. This means a great saving in manual labor as well as a saving of time. In time of war the importance of reducing the labor of coaling is apparent to everybody.

The United States Navy Department began a few years ago to build colliers from their own designs or prescribed characteristics. The first two were the fleet colliers *Vestal* and *Prometheus*, both 16-knot ships, carrying 6400 tons of coal each. Next were the *Mars*, *Vulcan* and *Hector*, sister ships, with 12 knots speed and 7200 tons carrying capacity. The colliers *Cyclops* and *Neptune*, now under construction, will have 14 knots speed and carry 12,500 tons of coal each. All of these colliers, excepting the *Cyclops*, carry a novel form of coal-discharging gear known as the Marine Transfer. The *Cyclops* will discharge its coal by self-filling buckets, but with a different system of rope leads not at present known by the author.

The Marine Transfer on the colliers *Mars*, *Vulcan* and *Hector* comprises the winches and a novel form of rope lead with blocks and ropes to operate a self-filling bucket for discharging coal from a collier. The masts and booms on these three colliers are cheaper than on the *Vestal* and *Prometheus*, but they are less favorable to the operation of the Marine Transfer. A far greater amount of coal can be taken out of these colliers with the clamshell bucket before trimming is necessary than is possible on the *Vestal*. The operation of the bucket is practically the same on all the colliers.

In the official coaling trials discharging into a barge and using the large bucket:

The *Mars* handled 137 bucket-loads, aggregating 117 tons.

The *Vulcan* handled 155 bucket-loads, aggregating 180 tons.

The *Hector* handled 175 bucket-loads, aggregating 190 tons.

Ordinary seamen on board these colliers were drilled to operate the Marine Transfers with the clamshell buckets, from which it has been established that two fairly intelligent men require about eight hours to become sufficiently proficient to be capable of discharging 100 tons of coal per hour per hatch. One hundred and ninety tons of coal per hour per hatch can be discharged at any time with winchmen of sufficient skill and practice.

The author believes that the maximum efficiency in coaling will be attained by employing clamshell buckets delivering coal in bulk directly into bunkers when possible and when impossible into hoppers on the deck of the ship to be coaled, such hoppers to be arranged so that trucks holding about 1 ton of coal can be pushed beneath the hopper and filled therefrom by the movement of a valve or gate, the coal then to be trucked to various parts of the deck, where it can be dumped through coal chutes to the bunkers. Such a method will reduce the number of men involved to a minimum. It would save the cost of coal bags or baskets. It will save the fatigue of the sailors in shoveling coal and carrying baskets or the dragging of bags of coal on the deck. The author believes that coaling with bags will gradually give way to coaling in bulk, and a great saving in the cost of bags will then accrue to the navy.

There are three important points involved in the design and construction of the Marine Transfer winches:

1. The employment of flat metallic slipping frictions with air-cooling passages.

2. The employment of a lever control, which makes the operation comparatively easy.

3. The position of the operator is such that he can see the bucket in all parts of the hold as well as in every position it might take above the hatch.

The metallic slip frictions on all of these colliers involve the use of an extra hard steel plate attached to the gear and the employment of friction blocks made of a special composition. Wire seems to be the only material of which to make the ropes properly.—*International Marine Engineering.*

THE NEW CUNARDER.—The Cunard Company have placed an order with John Brown & Co., of Clydebank, for the construction of a new Atlantic liner, which promises to be the largest ship yet ordered, exceeding the *Olympic* and the *Titanic*, now being constructed by Harland & Wolff for the White Star Line, and a Hamburg-Amerika liner being built at the Hamburg Works of the Vulcan Company at Stettin. The design of the new Cunard ship has not yet been finally settled, and it is therefore premature to give any particulars, but it is understood that she will be about 885 feet in length over all, of about 50,000 tons gross register, and, in order to ensure a sea speed of 23 knots in service, the machinery, which will be of the turbine type, driving four shafts and screws, will be of between 50,000 and 60,000 shaft horse-power.—*Engineering*.

NAVAL UNIFORM ESTABLISHED.—In response to the request of a correspondent we publish the original order of the Admiralty establishing uniform which is to be found in an Admiralty order book at the Record Office. It is clear that patterns were considered sufficient without a detailed description of the "cloathing," and there can be little doubt but that the patterns found at Plymouth in 1846, and now at the Royal United Service Institution, were some of those referred to in this Admiralty order:

"By the Commissioners for executing the
Office of Lord High Admiral, &c.

"Whereas we judge it necessary, in order the better to distinguish the Rank of Sea Officers, to establish a Military Uniform cloathing for Admirals, Captains, Commanders, and Lieutenants, and judging it also necessary that persons acting as midshipmen should likewise have an uniform cloathing in order to their carrying the appearance which is necessary to distinguish their class to be in the Rank of Gentlemen, and give them better credit and figure in executing the commands of their superior officers; you are hereby required and directed to conform yourself to the said Establishment by wearing cloathing accordingly at all proper times; and to take care that such of the aforesaid officers and midshipmen who may be from time to time under your command do the like—And it is our further direction that no Commission Officer or midshipman do presume to wear any other uniform than what properly belongs to his rank. Patterns of which for Admirals and Vice-Admirals and also for Rear-Admirals may be seen at the Admiralty Office, and Patterns for each dress of other officers, vizt., Captains who have taken Post three years, and by His Majesty's late Regulations rank as Colonels; all other Post Captains who by these Regulations rank as Lieutenant-Colonels; Commanders not taking Post; and Lieutenants, and likewise for midshipmen, will be lodged at the Navy Office, and with the Storekeeper of H. M. Yard at Plymouth.

"Given under our hands, etc.,
"13th April, 1748.

"DUNCANNON. WELLBORE ELLIS. JOHN, EARL OF SANDWICH."

The above order was sent to the captains of eighty-seven ships of war, seven yachts, and two storeships—both captains and ships being named in the order—and also to the Admiral of the Fleet (Sir John Norris) and nineteen other flag officers.—*Army and Navy Gazette*.

FRENCH IMPRESSIONS OF OUR FLEET.—The prolonged sojourn in the Brest and Cherbourg roadsteads of the Howard and Vreeland divisions of the U. S. Battle Fleet, together with the visit of the American seamen to Paris, has attracted general attention in France, making a deep impression in all circles and causing Frenchmen to realize objectively the rise of American naval power. The sturdy appearance of the crews, as well as the amiable intercourse which established from the first between Gallic and United States officers, were the object of favorable comment; and if

Paris and provincial papers somewhat exaggerated the unpleasantness which arose in the harbors through the dishonesty of a few traders, they have been, on the other hand, loud in their praise of the formidable looking *Louisianas* and *Georgias*, bristling with guns, and rendered outwardly all the more formidable by being moored alongside obsolete 12,000-ton cuirassés of the *St. Louis* and *Carnot* types.

To French naval men who examined them critically from a professional standpoint the United States battleships revealed themselves as splendid war machines, obviously designed by practical men primarily with a view to fighting, but all the same admirably fitted internally with comfortable quarters and up-to-date arrangements, and far in advance of French ships in most respects.

The comparative merits of the United States battle divisions have, of course, been the object of an animated discussion in naval circles, and it is a prevailing opinion here among experts that, outside of the English home fleet, there is nothing in Europe able to tackle Admiral Schroeder's armada. Even the twenty-four battleships which Germany could put into line (by bringing in her reserve) would find themselves excelled in gun power and in general qualities by the sixteen American ships. The *Delaware* and *North Dakota*, with their broadside of ten 305-mm. guns, and the *Michigan* and *South Carolina*, which fire abeam eight guns of similar caliber, are considered as being more than a match for the four *Nassaus*, armed with the inferior 280-mm. weapon and only able to train broadside eight out of the twelve heavy cannon they have on board. It has been calculated—counting only turret guns—that the broadside of the German *Dreadnought* division only amounts to 10,880 kilos, as compared with 14,200 kilos for the four United States all-big-gun ships. And there can be no doubt as to a *Louisiana*, *Georgia* or even a *Idaho* being much more than able to hold her own against a 13,200-ton *Deutschland*, without speaking of the obsolete and weakly armed *Wettins* and *Kaisers*. The American ships of the line would have advantage in all ways over their Teutonic opponents, viz., heavy guns and medium-sized guns of larger calibers (305 against 280 and 240, and 203 and 178 against 170 and 150 mm. weapons) and a superior protective system. The weight of the broadside of the *Georgia*, for instance, is 2566 kilos, against little over 1800 kilos for the German *Deutschland* type. Well it may be said that the "citoyens de la libre Amérique" have got a proper return for the money expended in their fleet!

The *Michigans* and *Delawares* have been frankly admired, and many officers who have visited them have since become warm partisans of the "American" axial line of turrets, judged to offer the greatest practical arc of fire and the highest military utilization of the heavy artillery. In this respect the American visit is likely to have an influence on future French construction, especially on the 1912 ships, which are to carry the new 340-mm. caliber, now being prepared.—*Army and Navy Journal.*

THE PROBLEM OF THE SCHELDT FORTIFICATION.—The little states of Western Europe are at times almost forgotten in the whirl of discussions around strategical policies as evinced from time to time by their more powerful neighbors. What the ultimate future of these little kingdoms will be it is somewhat difficult to foresee, for they are wondering which of their continental confreres will overlap them in the forthcoming struggle of Titans. It is an unenvious position for these buffer states, because, unless the peace of Europe is assured, prosperity for them is out of the question. That it should not be so in these days of treaties and ententes seems to be the thought in all well-balanced minds, but it is the fact of minds being so well balanced to-day that brings home to the small states the terrible meaning of the Droit d'Augarie, which permits a belligerent in a case of absolute necessity to use or destroy the property of a neutral state—this is looking at it from the light of Holland or Belgium—two well-

established states which just now are the unwilling cynosure of all eyes on the political horizon.

The interest aroused by Holland's proposal to fortify certain parts of her territory on the River Scheldt—which, of course, from a legal point of view, she is perfectly entitled to do—has given rise to a feeling of insecurity as regards the independence and neutrality of Belgium. This latter is guaranteed by five other European Powers and the history of that guarantee is worthy of some note at the present moment. In 1814, Prussia, Russia, England, and Austria, after long deliberations, etc., decided to put, if possible, a check on the roving ambitions of France, and called into being the kingdom of the Netherlands, which comprised both Holland and Belgium. The annexation was attended with a certain amount of danger, but this soon passed, only to be replaced, however, by a state of internal strife between the two races that was something akin to civil war. The fact of the matter was that the two countries were so entirely different in history, language, religion, and many other essential factors to unification, that the union proved impossible, and in 1830, to put a stop to the internal strife between the two peoples, a conference was held in London—the four original Powers and France attending—which decided that the only solution of the problem was to make Belgium a separate state and guarantee her independence. This the five Powers undertook to do, but the conditions attached to the guarantee were very much resented by the Belgians, who eventually elected Prince Leopold of Saxe-Coburg as their King, having for their intention the creation and vindication, out of their own strength, of an independence which would relieve them of all the national and financial disadvantages that they had undertaken by their acceptance of the terms of the Conference of London. Had Belgium possessed at that time sagacious instead of incompetent statesmen all might have been well, but the sympathy of Europe was soon weaned from her owing to her wayward actions and evident incompetence—both in council and on the battlefield.

King William of Holland invaded Belgium at that period, and France had to step in and protect the new state, the ultimate result being that the Powers again drew up articles, which were even less to Belgium's advantage than those which had provoked the trouble. Holland refused to accept these articles, or to recognize Belgium. So the Powers enforced peace between the two nations, but contented themselves with sitting on the fence, until in 1838 King William made tardy overtures to the Powers to adjust their territorial and financial difficulties. This was done, and with one important exception, the terms imposed by the Powers in 1839 apply to Belgium to this day. Her independence is absolutely guaranteed by the five Powers, but it is well to bear in mind that the five Powers *must act together*, so that if one Power abstains (say Germany, for example), then the action of the other four might probably be rendered invalid. To follow the matter intelligently one must keep in mind the fact that throughout all these *pourparlers*, Holland retained control of that commodious approach to Antwerp—the mouth of the Scheldt—and it was this fact that caused so much ill-feeling and protest from Belgium for a quarter of a century that it led to the freeing of the River Scheldt in 1863, and for this concession Holland received a sum of money which has been placed at about £1,300,000, the greater part of which was paid by the Powers concerned in the guarantee. As a result of that payment the Scheldt became an open waterway of the world.

It can, therefore, be readily understood that any contributing party to the freeing of the river has some right of interest and claim to be consulted, whilst Belgium, after the years of prosperity and comparative calm for her that have elapsed, may well be excused if she returns to that attitude of resistance which existed between her and Holland from the very outset of the original settlements, for if the fortification of the Scheldt is carried out, it brings her back to the days of her former insecurity and

humiliation, for in the event of hostilities Antwerp would lie at the mercy of Belgium's old antagonist or her masters. Further, it would appear that having been paid to free the river in 1863, any erection of works calculated to jeopardize such freedom would be somewhat out of order. It is, of course, deplorable from all points of view to contemplate the probable violation of the territory of a neutral state, but the necessities of war know so few defined courses that the Right of Angary is fast attaining universal acceptance. To combat this evil one has to watch most carefully the trend of national strategy, meeting Greek with Greek, and guarding, if possible, in their initial stages, against inacceptable situations which would arise were hostilities to break out, and which, so far as operations of any extent on the Continent are concerned, commonly arise between France and her neighbors. The well-defined utterances of the French Ministers make it quite clear that the fortification of the Scheldt is not acceptable, whilst on the other hand German legislators seem to encourage the idea, no doubt in furtherance of their strategic policy; for anyone who has noticed the preparations and provisions for detraining, etc., which she has necessarily to make in order to be ready for concentration, will have observed that the axis of attack or concentration has shifted considerably of late, and in such a manner as to indicate that the neutrality of the Netherlands in case of hostilities is threatened thereby.

It is to be hoped that no calamity may arise from the Scheldt problem, which is only one of the many sidewinds that have for a long time past been forcing matters in a certain direction. The mariner entrusted with the Ship of State would do well, however, to watch closely the drift of this political and strategical gulf stream.—*United Service Gazette.*

BUILDING OF THE NEW CANADIAN NAVY.—The Dominion Government have announced from Ottawa that contracts for the proposed ships to form the beginning of a Canadian navy will be fixed in the near future. It is understood that six British shipbuilding firms have been invited to tender for the new construction, and offers have been made by some Canadian firms to undertake the work. The tenders at present asked for are for four cruisers, presumably of the *Bristol* type, and six destroyers. It is stated that the contracts for all of the ten vessels will be entrusted to a single contractor, and the reason for this is probably the decision of the Ottawa government that all of the vessels must be built in Canada.

The question at once arises—Where are they to be built? Already there are rumors that point to Vancouver, on the Pacific coast, as destined to be the favored locality. It is situated on the finest natural harbor of Canada, and the construction of a large dry dock is to be immediately proceeded with there. Proposals are also on foot for building a floating dock capable of lifting ships of 15,000 tons displacement.

The Pacific coast offers very many attractions to a shipbuilder. Its harbors are as fine as any on the Atlantic coast, and facilities for obtaining material are good. Coal and iron are obtainable at the very door, and if requisite capital to erect adequate smelting works and rolling mills were forthcoming, the business of steel shipbuilding, which has already reached respectable growth, would receive a tremendous incentive. If it be true that the new Canadian navy is to be built at this port, its future as a shipbuilding center is assured. The coasting trade alone provides a considerable amount of repair work, much of which is at present diverted to other ports from lack of docking accommodation. Such firms as Harland & Wolff, Swan, Hunter, and Wigham Richardson, and others have had representatives on the spot making investigations as to the possibilities of development along these lines.

Vancouver has one decided advantage over Atlantic ports in its Pacific slope climate, which would render the business of shipbuilding possible all the year round. Burrard Inlet, upon which it stands, seems to possess all the requirements which appeal to the professional and business instincts

of the shipbuilder. It is an ideal site for the purpose. The harbor is magnificent, being landlocked, and therefore quite sheltered. Within the First Narrows, known as the Lion's Gate, the shore of the harbor proper, not including the north arm of Burrard Inlet, extends 25 miles, while the width is 2¼ miles. The low-water depth at the wharves is 26 feet, and in the stream about 30 fathoms. The average rise and fall of tide is 13½ feet. At low tide the present entrance to the harbor has a width of 700 feet at its narrowest point. It is, however, to be widened to 1200 feet, and dredged to a uniform depth of 30 feet to 35 feet at dead low water. A contract has been placed by the Dominion government for a special dredger to do this work, which will be completed, it is estimated, in about three years, including the removal of some shoals and a projecting reef. At the wharves of the shipbuilding business at present in operation there is a depth of 30 feet of water at low tide, so that war vessels could be afloat at all times.

Burrard Inlet, then, needs little artificial improvement to make it suitable as a shipbuilding center, whether for warships or merchant vessels, and it is likely to be a strong, if not the strongest, competitor for the construction of the new Canadian Navy. Indeed, the site at North Vancouver, upon which large shipyards are to be erected in the near or more distant future, is practically settled; it is on the north shore of the inlet, where there is plenty of deep water close in shore. The Imperial Dry Dock and Shipbuilding Company has been granted a subsidy from the Dominion government, and Roche Point has been selected as the site of a new dock. Victoria, 84 miles from Vancouver, has at present the lead in shipbuilding when compared with Vancouver, and has turned out such vessels as the Princess Royal and Princess Beatrice, for the C. P. R. line. Notwithstanding this, Vancouver appears from its natural suitability for the purpose, destined to become the largest shipbuilding and commercial center on that part of the Pacific coast. It possesses with the minimum of expenditure, a harbor such as many seaports cannot secure at any price. The only shipbuilding now carried on there of any importance is on quite a small scale, but it is up-to-date so far as it has gone, and although the larger of the two firms employs less than a hundred hands, and it is of quite recent establishment, it is intended to be the nucleus of a much larger concern.

There are large coal deposits in the immediate neighborhood; a new mining corporation called the Canadian Collieries Company, has recently acquired an immense coalfield on Vancouver Island, and has devoted three million dollars to opening up and developing of new mines on their property, and to increasing the output of those already in operation. Mechanical haulage, by means of electric power, generated by a 50,000-horse-power water-fall will be installed, and this source of power will at the same time supply other affiliated businesses.

The beneficial effects of this progressive policy will be felt by all business men in the district, for all need coal; and specially is it important if Vancouver is to become an important shipbuilding center. The possibilities of early development in this district has been foreseen by many notable British firms. Cammell, Laird & Co., for instance, do a large trade with the various mining companies and manufacturers of the province. Stamps, dies, high-speed tool steels, hollow-drill steels, nickel steel, and other specialties of the firm, are supplied in large quantities through the resident agent in Vancouver.

It is a trite saying, that progress of trade in a seaport is infallibly indicated by the appearance of the wharves on the water front, and this port is no exception. Her rapidly extending wharfage is generally in a more or less congested condition. In the Vancouver service, Messrs. Alfred Holt & Co., of the Blue Funnel line as it is termed, maintain a fleet of eight fine vessels. The C. P. R. steamers, and the Andrew Weir line, both run constantly between Vancouver and the Orient. The Canadian-Austra-

lian mail service to Sydney is carried on by the Union Steamship Company of New Zealand, and a large cargo business is done with goods from the Atlantic coast and Europe, which are transported across the Isthmus of Tehuantepec by the railway from Puerto-Mexico, to Salina Cruz, and thence re-shipped to ports on the Pacific coast. This latter route is so much cheaper than the trans-continental railway freight, that a consignment of goods from, say, Montreal to Vancouver would be carried *via* the Isthmus for little more than half the overland railway freight across the Continent.

Five years, or even three years ago, export of Canadian grain from Vancouver was a dream only entertained by one or two far-seeing and optimistic individuals. About two years ago the probability of Vancouver becoming a great factor in the shipment of grain from Alberta and Saskatchewan began to attract atention, and to-day she is a grain-exporting center whose output is only limited by the present dimensions of the demand for Alberta wheat. When the Panama Canal is opened there will probably be a great deflection of the present eastward flux of wheat from Alberta, Saskatchewan, and Manitoba to the western route *via* Vancouver, with a very considerable saving of time as compared with the lake route. Vancouver harbor is open and free from ice all the year round, and great things are expected of the A. B. C. route—Alberta British Columbia—as a great exporting channel for Canadian grain.

The growth of the railway systems of British Columbia is commensurate with expansions apparent in other directions, and Vancouver is fast becoming one of the biggest railway centers on the Pacific coast. The question is, will its natural advantages cause it to become the chief seaport of that coast? Basing judgment on its geographical and terminal position, it appears probable that it will. For nearly twenty years the C. P. R. was the only railway entering the city. The Great Northern and the Northern Pacific came later, giving an example likely to be soon followed by others. Three years will see the Canadian Northern connection complete with the East. The Grand Trunk Pacific has engineering parties in the field, with Vancouver as the main objective, and its line will probably be completed within five years. Other subordinate lines are also in construction.

All this goes to show that the Dominion government have every reason to favor Vancouver as a likely position for building and equipping their new navy. By the time the first instalment of it is in being, there will be a valuable national asset to protect there, and one can easily imagine how strong an appeal such a natural harbor as Burrard Inlet must make to both the technical and strategical components of the Dominion government.—*The Engineer.*

NAUTICAL RESEARCH.—The Society for Nautical Research has been launched successfully, with the practical good wish that all associated in the undertaking may progress and prosper. It has, indeed, in its constitution many elements of success, and it starts under the best auspices for a long and useful life. The initial issue of its journal will soon make its appearance, and will afford a full indication of the purpose and objects of the society. It is quite well that these should be made clear, because the better they are known and appreciated, the more likely it is that the foundations of the society will be firmly and strongly laid, and the wider its sphere of activity will become. It is important to dwell, for example, upon the scope of the work of the society as shown in its title and also in that of its journal. The former, it will be noticed, comprises all nautical matters, and therefore includes much more than what is strictly naval, while the latter emphasizes the extension of the field of its research to seafaring matters relating to "all ages and among all nations." The influence of maritime life and maritime environment is but partly known unless its first principles are studied, and inquiry carried back to the earliest endeavors in this direction, while it must exclude nothing, however remote, which

can throw light upon its progress and development. That public interest in naval matters has grown enormously of late years there is plenty of evidence to show, but it is essential that this interest should be extended to matters which, while not perhaps distinctly naval, have a direct bearing upon the study of seafaring in its philosophical, scientific, and professional aspects. It is to foster this study and to simplify the task of students that the Society for Nautical Research has been established.

There are two points of interest about the society which call for special mention. First, its composition and membership, and secondly, its method of procedure. The governing body of the society is thoroughly representative of all the varied interests to which the new institution appeals. It has as its president Vice-Admiral H. S. H. Prince Louis of Battenberg, and among its vice-presidents are two other naval officers, Sir Cyprian Bridge and Sir Reginald Custance. There are also in this list Lord Brassey, the Lord Warden of the Cinque Ports; Lord Inverclyde, whose connection with the great shipping interests is well known; Sir Clements Markham, the late president of the Royal Geographical Society; historians are represented by Sir John Knox Laughton and Professor C. H. Firth; Sir Philip Watts represents in a unique manner naval architecture; Dr. Edmond Warre, the late headmaster of Eton, stands for classical scholarship; while the name of the distinguished Royal Academician, Mr. W. L. Wyllie, aptly indicates the connection of the society with naval art. Similarly, in the Council, not only is the navy represented, but nautical research, literature, and art, discovery and exploration, yachting, charitable endeavor among seamen, and many other branches of maritime affairs. The society is, therefore, far from being exclusively governed by naval officers, and this is as it should be, seeing that amongst its members are men of many professions and callings, seamen both of the navy and of the mercantile marine, naval architects, historians, antiquaries, scientists, underwriters, lawyers, artists, and many others whose work brings them in touch with the sea. Its membership extends, indeed, to every quarter of the globe, and includes many foreigners interested in the subjects with which it deals. This widening of its base should be of the greatest value when the society gets into full working order, for without help from abroad it would be difficult to obtain information upon many matters which the society is established to study. It is here also that the journal of the society, the *Mariner's Mirror*, should be of immense service as a "means of intercommunication between members of the society." It is not so much to be expected, perhaps, that any large number of members will undertake independent research work, but all can help, either by sending inquiries to the journal or by writing for it short articles on subjects in which they are specially interested. In this way it may be hoped that a comparative study of maritime methods and customs will be encouraged, and the contemporary usage of our own and each foreign marine explained and elucidated.

It is, however, the columns devoted to notes and queries in the *Mariner's Mirror* which will probably be found most attractive by the largest number of members. It is these columns also which should be in time productive of the best results towards the fulfilment of the objects of the society. That the society should be able, from its own resources, to answer any kind of nautical question is, of course, the ideal which it will set before itself. But this can only be realized if members, as well as sending in questions, will also give assistance in answering those put by others. That there is a very wide field for inquiry is suggested by the headings of various sections of the work, such as antiquities, architecture, art, bibliography, biography, equipment, folk-lore, history, laws and customs, organization, technology, etc. Probably the questions will generally fall under one of two heads—first, those which are concerned with the design, structure, and equipment of ships and the bearing these matters have upon strategy and tactics; and, secondly, those relating to the customs, habits,

usages, and conventions of the sea. The questions in the first category may be the more important from many points of view, but those in the second will probably have the widest interest. There will be demands for missing portraits and for illustrations of early ships and sailors. There are many terms, both in ancient and present use, for which explanation will be desired. Then, again, the origin of customs, the use of flags, and the antiquity or meaning of various practices will call for elucidation. There is much about the dress and pay of the seaman which it is desirable to learn, and then there are many recondite subjects, like the institution of freemasonry afloat, and the encouragement of theatricals in the ships of the blockading squadrons, with similar matters having a special interest of their own. Of course, there are many such questions to which it will be difficult to find answers, and, in any case, answers can only be found through some recognized method of intercommunication such as the Society for Nautical Research is now going to supply. It is to be hoped, therefore, that the society will find support in many unexpected quarters, that it may flourish, and be able in the future to make a start upon the still more ambitious projects which it has in view.—*Army and Navy Gazette.*

NAUTICAL RESEARCH.—At the first annual general meeting of the Society for Nautical Research, which was held at the Royal United Service Institution, the announcement was made that the Admiralty would subscribe for a large number of copies of the new journal which the society is to publish monthly under the title of the *Mariner's Mirror.* The original *Mariner's Mirror* from which the title is derived was a Dutch work called "Speculum Nauticum," by Lucas Wagenaar, published in 1584, which was translated by Anthony Ashley in 1588, the year of the Armada, and issued as the Mariner's Mirror. The new monthly is to serve as a medium of intercommunication between members of the society, and its scope is well illustrated in the sub-title, which reads: "Wherein may be discovered his (*i. e.*, the Mariner's) Art, Craft, and Mystery, after the manner of their use in all Ages and among All Nations." Mr. L. G. Carr Laughton, to whom the founding of the new society is mainly due, will act as editor, and no one better equipped for such a position could have been found. The objects of the society are "to encourage research into nautical antiquities, into matters relating to seafaring and shipbuilding in all ages and among all nations, into the language and customs of the sea, and into other subjects of nautical interest," and those who have not already become members should send as soon as possible to the secretary at 5, Ruvigny Mansions, Putney, S. W., in order to receive the first number of the journal.

THE ARMAMENT OF BATTLESHIPS.—The general principles of warship designs belong to no one nation. It needs, however, the practical as well as the theoretical experience of past years, gained both at sea and in office, of experimental work afloat and ashore, and of design work tempered by the judgment of its unbiassed users, to produce a ship, especially one for purposes of war, in which everything is not only placed to the best advantage, but which shall simultaneously possess the important quality of fighting power associated with peace time convenience and habitability. Just at the present moment, when the competition in naval armaments has pressed to the very utmost the output resources of the great armament firms in England, Germany, and the United States, the views of Sir William White, as they appear in an interesting paper on the subject of battleship armaments to the Society of Naval Architects and Marine Engineers in New York, are of more than usual interest. Sir William White has probably designed more warships than any other naval architect, and his views have invariably been expressed with a temperate logic that goes far to carry conviction in the face of marked and able differences of view,

enunciated more emphatically, but almost inevitably based on shorter experience of the subject under discussion. Sir William's views in his latest paper indicate very clearly that his reputation for clarity of exposition has lost none of its force since he resigned the position of Chief Constructor to the Royal Navy.

The arguments in the paper under discussion reflect very fairly the views of the two camps into which gunnery schools may be said to be divided. One is the all-big-gun one-caliber school, while the other advocates a secondary armament for battle purposes. As Sir William points out at the beginning of his paper, the fundamental idea which has governed the armaments of warships in all ages is the desire to provide means of offence which will enable a ship to destroy her adversary in the shortest possible time with the minimum damage to herself, and active offence still constitutes the best, though not the only means of doing so. The best arrangement of armament for this purpose is discussed largely on the lines of Sir William's criticism of Admiral Bacon's paper on the "Battleship of the Future," read before the Institution of Naval Architects in London a year ago, and more space being at his disposal on this occasion, the pros and cons of the *Dreadnought* type are comprehensively analyzed, and deliberate opinions expressed as a result. Let it be said at once that Sir William advocates the re-adoption of the 6-inch gun as a fighting weapon in association with not more than four twin center line turrets arranged as in the *South Carolina*, an arrangement which it is said is to be adopted in the new Japanese ship being built at Barrow. Whether the big-gun advocates will believe that in the latter case the secondary armament is for fighting or for anti-torpedo boat purposes is another matter.

It is generally agreed that battle ranges have inevitably increased of late years, owing to the development of the torpedo, and to systems of fire control associated with improved gunnery. Conflicting views are held as to what the range will be. Climatic conditions, and a serious intention of attaining a decisive issue, may tend to reduce the range that would be chosen by the faster all-big-gun ships. Herein lies the crux of the situation. When the earlier *Dreadnoughts* were built, their speed gave them the advantage of choosing the range. Now that there are numerous ships of this type, as well as much faster torpedo craft afloat, there is a strong tendency to develop the smaller weapons. But for what purpose? Not for battleship attack directly. For indirect attack, for keeping up a "blanketing" fire with the object of making it difficult for the enemy to see the attacking ship and on the off chance of their effecting damage to unarmored structures and communications which influence fighting efficiency they may be useful, but it becomes a question, as Admiral Bacon said, as to whether adequate value for tonnage involved is obtained by their adoption. Obviously if they are installed at all they can be used for any or all purposes as long as they remain in action. The "volume of fire" obtainable from such quick firing would, some say, inflict considerable damage, and the experience of the Russians at Tshushima is generally dragged in to prove it. It is in this case. Well, in Captain Semenoff's book, quoted in the paper under review, we find on page 124 the remark: "That's only a 6-inch; no more 'portmanteaux' now!"—the word referring to the Japanese 12-inch shell. Again, on page 135: "There was a loud crash . . . . this was not a 6-inch shell, but the 'portmanteaux' again. The men became seized with panic. . . . ." Semenoff tells ably of the utter destruction due to shell fire, but his words are apt to be misread; the heavy shell was what they feared, and a similar well-directed fire from the Russian ships—secondary or primary, or big torpedo—would have kept the Japanese far further away, obviously leaving the action even more to a question of "portmanteaux." With this practical experience in view, it is impossible to reconcile Sir William White's reason for believing that actual trials do not confirm the objection to mixed armaments on the ground that the simultaneous discharge of guns of different calibers

must be accompanied by diminished efficiency in the control of fire and in the proportion of hits to rounds made by guns of different calibers. As we stated some time ago, when gun fire is handled so as to obtain hits, not merely volume of fire, the rapidity of discharge is much below the possible rapidity of fire of the gun. Admiral Bacon suggests that it is merely a quarter of the potential rapidity, and aptly remarks that rapidity of fire, unaccompanied by rapidity of hitting, is a futile waste of ammunition. We hold most strongly that in the *King Edward* class, for instance, the accuracy of 6-inch fire is materially affected by the simultaneous discharge of the 9.2-inch and 12-inch guns. It suffers also in rapidity from the smoke nuisance.

In referring to the number of heavy guns to be mounted, Sir William advocates pairs, and goes on to note the extraordinary Italian practice of mounting three triple and two twin turrets in the *Dante Alighieri* class. Triple turrets involve insuperable objections to practical gunners of the "hit-the-target" order; beside being too many eggs in one basket they suffer from smoke interference and "throw-off" to an excessive extent. The relationship of protective material and the adequate support of the same also receives attention. In many foreign vessels we find turret roller paths fixed directly to or supported on the vertical barbette armor—a most dangerous practice, as in action the combined efficiency of the heavy gun armament, in spite of heavy blows on the protective armor, is a primary consideration. Adequate clearance between fixed and moving portions of a turret should always be allowed in spite of the increased overall dimensions and weight necessary. Reference is made to the maximum number of heavy guns that should be carried by a warship. Here the author is on much safer ground. In tonnage, value for effect obtainable, it is hard to believe that it is possible to improve on the arrangement, first adopted in the United States battleship *Michigan*, of four twin turrets on the center line, the two inner turrets firing over the two end turrets. Such an arrangement possesses the great advantage of minimum interference between turrets due to "blast." The system adopted in the *Inflexible* class, in the *Von der Tann* or the Spanish battleships, of having two center line and two echelon turrets, really reduces these vessels in practice to the status—considering broadside work only—of six-gun ships. On paper, the echelon arrangement allows three pairs of turrets to fire ahead and astern on the keel line. On board, such a discharge causes unpleasant consequences, and the limits of safe training in practice are considerably less than the extremes shown on the drawings. Of course, automatic danger signals—generally shrill buzzers by the side of the turret training levers—are supplied to warn the gun-layer when he risks his own or his neighbor's comfort from blast, but these are extremely apt to be unreliable in action, and the system of mounting guns to avoid this, even if the number of heavy guns be reduced, will probably be found best in service. The advantage conferred by confining the primary armament to the ends of a ship, as far as magazine accommodation is concerned, is very considerable. Side turrets, as in the *Dreadnought* or *Minas Giraes*, are inconvenient—the *Nassau* is very bad with four large turrets crowded together—owing to the difficulty experienced of making a good boiler and engine-room arrangement. Sir William White does not touch on the point beyond referring to the objection to mixing stokeholds and magazines, but it entails probably an additional row of boilers to make up for the staggered units cut out by an echelon arrangement, or an increased length over the machinery space to allow for a transverse magazine. This involves a corresponding addition to the length, weight, and cost of the heavy belt armor. In view of this and the question of interference, his deliberately expressed convictions that in no case is it desirable to mount more than eight heavy guns in a single ship, and that these are best arranged in four positions as in the *Michigan* class, will meet with less criticism than his third view that they should be supplemented by a powerful and well-protected secon-

dary armament. A large number of naval officers want a protected 6-inch battery reintroduced, in spite of their expressed conviction that its fire may be discounted at ordinary battle ranges when accompanied by a 12-inch gun fire. Here is where Sir William White takes an opposite view. A secondary battery mounted as in the *Michigan* on the upper deck is, in our opinion, vastly better than the corresponding main deck battery of the *Delaware*. With, however, the smoke nuisance from the heavy guns, the continual anticipation of blast effect from overhead and the lower rate of fire inevitable from these causes, as well as from the desire for accuracy, it is hard to agree with him. The naval desire for the re-introduction of the 6-inch gun arises from a belief that it is a better anti-torpedo gun than the 4-inch. Opinions on this point also differ widely. If the increased caliber of heavy gun tends to put up battle ranges, then it probably is; but, as we stated in the article we referred to, the 4-inch should also be retained, in our opinion, for mounting in the superstructure.

At the conclusion of his paper Sir William White turns to the important point of future gun caliber, and draws a trenchant parallel between present practice and that of twenty years ago. All the arguments that held good for the increase from 12 inches to 13.5 inches hold good for an early advance to 15 inches or 16 inches. Such a gun is being made, we believe, at the present time. No argument is raised against such a caliber, except that of larger or more costly ships. This has never been heeded. Warships of all kinds are generally smaller than merchant vessels, and for many years the largest have never exceeded about 60 per cent of the greatest mercantile displacement. There are at present at least four ships being built with over 60,000 tons full load displacement, and an increase in warship size is inevitable in the early future. So it is with speed. The *Von der Tann* and *Lion* will set examples of a far-reaching kind. Nothing is said of the tactical influence of speed or armament in the paper under review, but it is obviously considerable. Meanwhile, in spite of Sir William White's generous treatment of the subject, we feel assured that the big-gun school, adhering to the results of their practical experience, will remain unconvinced that for fighting purposes anything less than the biggest convenient gun is worth having.—*The Engineer.*

ANNUAL REPORT OF THE SECRETARY AND TREASURER OF THE U. S. NAVAL INSTITUTE.

To the Officers and Members of the Institute:

Gentlemen:—I have the honor to submit the following report for the year ending December 31, 1910.

Itemized Cash Account.

Receipts for the Year 1910.

Items.	First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Totals.
Dues	$1,794 01	$417 45	$170 25	$145 65	$2,527 36
Subscriptions	905 46	102 79	245 60	277 05	1,530 90
Sale of books	6,078 35	4,914 51	7,012 79	6,859 71	24,865 36
Sale of Proceedings	22 76	6 23	14 16	11 94	55 09
Advertisements	120 46	349 66	14 38	104 79	589 29
Interest on investments	437 59	397 87	706 15	394 95	1,936 56
Postage	3 74	6 67	2 33	4 45	17 19
Binding	20 38	1 70	1 70	0 00	23 78
Expressage	70	30	0 00	0 00	100
Credits	17 50	0 00	6 24	6 03	29 77
Baltimore and Ohio Bonds	6,010 00	0 00	0 00	0 00	6,010 00
Premium on money orders and drafts	16	62	0 00	29	1 07
Life Member's fee	0 00	30 00	0 00	0 00	30 00
Rebates on insurance	0 00	0 00	0 00	71 10	71 10
Totals	$15,411 11	$6,227 80	$8,173 60	$7,875 96	$37,688 47

EXPENDITURES DURING THE YEAR 1910.

Items.	First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Totals.
Printing and binding Proceedings	$828 42	$946 37	$972 16	$804 30	$3,551 25
Printing and binding extra publications	1,953 56	1,932 04	2,316 41	3,795 07	9,997 08
Salaries	780 00	780 00	780 00	795 00	3,135 00
Contributors	501 00	662 00	455 00	675 00	2,293 00
Authors of text books	80 00	676 14	618 60	2,537 95	3,912 69
Postage	152 99	132 82	139 92	129 71	555 44
Stationery	65 92	30 59	91 90	18 70	197 11
Expressage	32 32	23 13	12 01	17 58	85 04
Telegrams	6 50	1 09	1 36	1 78	10 73
Purchase of books for sale	33 56	54 81	4 65	51 70	144 72
Prize Essay award	215 50	10 75	0 00	0 00	226 25
Honorable Mention award	75 00	0 00	0 00	0 00	75 00
Advertising	0 00	0 00	25 00	0 00	25 00
Furniture	0 00	43 65	44 70	0 00	88 35
Discount on draft	0 00	0 00	22	24	46
Purchase of bonds	6,010 00	0 00	0 00	0 00	6,010 00
Typewriting	3 50	12 45	0 00	0 00	15 95
Rebates	5 00	1 15	0 00	6 43	12 58
Transferred from General to Reserve Fund	1,980 00	0 00	0 00	0 00	1,980 00
Rent Safe Deposit box	0 00	5 00	0 00	0 00	5 00
Remodeling typewriter	0 00	32 50	0 00	0 00	32 50
Office expense	0 00	0 00	0 00	3 64	3 64
Insurance on Institute property	0 00	0 00	0 00	80 00	80 00
Miscellaneous	0 00	2 50	1 00	8 75	12 25
Totals	$12,723 27	$5,336 99	$5,462 93	$8,925 85	$32,449 04

SUMMARY.

Balance unexpended January 1, 1910	$46,202.93
Total receipts for the year 1910	37,688.47
	$83,891.40
Total expenditures for the year 1910	32,449.04
Balance unexpended January 1, 1911	$51,442.36
Bills receivable for back dues	868.12
" " " binding	20.02
" " " subscriptions	143.50
" " " advertisements	627.50
" " " books	2,662.54

Interest due on money invested	112.50
Value of back numbers of Proceedings	200.00
" " Institute property	300.00
" " extra publications	1,000.00
	$57,376.54
Liabilities	943.97
Total assets	$56,432.57

RESERVE FUND.

Baltimore & Ohio Railroad Bonds	$6,663.14

The balance, $51,442.36, unexpended January 1, 1911, is distributed as follows:

Seamen's Bank for Savings, New York, N. Y.	$3,000.00
Rhode Island Hospital Trust Company	2,815.68
Society for Savings, Hartford, Conn.	2,856.82
Southern Railway Bonds	6,745.14
Washington Electric Railroad and El. Co.'s Bonds	1,715.00
Northern Pacific and Great Northern Bonds	12,903.14
Potomac Electric Power Co.'s Bonds	2,115.00
Northern Pacific Railway Bonds	8,902.45
Baltimore & Ohio Railroad Bonds	2,238.11
Cash in Farmers' National Bank	6,615.93
Checks in safe, Institute office	1.493.12
Money Orders in safe, Institute office	5.00
Cash in safe, Institute office	36.97
	$51,442.36

Respectfully,

PHILIP R. ALGER, *Professor, U. S. Navy,*
Secretary and Treasurer.

The books of the Naval Institute have been examined from January 19, 1910, to December 31, 1910, and found to be correct, and the balance sheet verified.

W. H. G. BULLARD, Commander, U. S. Navy,
E. H. DURELL, Commander, U. S. Navy,
GEO. R. MARVELL, Commander, U. S. Navy,
Auditing Committee.

LIST OF PRIZE ESSAYS.

1879.

Naval Education. Prize Essay, 1879. By Lieut.-Com. A. D. Brown, U. S. N.

NAVAL EDUCATION. First Honorable Mention. By Lieut.-Com. C. F. Goodrich, U. S. N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U. S. N.

1880.

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U. S. N.

1881.

The Type of (I) Armored Vessel, (II) Cruiser best suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U. S. N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U. S. N.

1882.

Our Merchant Marine: The Causes of its Decline and the Means to be taken for its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. J. Kelley, U. S. N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U. S. N.

"SPERO MELIORA." Honorable Mention. By Lieut.-Com. F. F. Chadwick, U. S. N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U. S. N.

1883.

How may the Sphere of Usefulness of Naval Officers be extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U. S. N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U. S. N.

"CULIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U. S. N.

1884.

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U. S. N.

1885.

Inducements for Retaining Trained Seamen in the Navy, and Best System of Rewards for Long and Faithful Service. Prize Essay, 1885. By Commander N. H. Farquhar, U. S. N.

1886.

What Changes in Organization and Drill are Necessary to Sail and Fight Effectively Our Warships of Latest Type? "Scire quod nescias." Prize Essay, 1886. By Lieutenant Carlos G. Calkins, U. S. N.

THE RESULT OF ALL NAVAL ADMINISTRATION AND EFFORTS FINDS ITS EXPRESSION IN GOOD ORGANIZATION AND THOROUGH DRILL ON BOARD OF SUITABLE SHIPS. Honorable Mention. By Ensign W. L. Rodgers, U. S. N.

1887.

The Naval Brigade: its Organization, Equipment and Tactics. "In hoc signo vinces." Prize Essay, 1887. By Lieutenant C. T. Hutchins.

1888.

Torpedoes. Prize Essay, 1888. By Lieut.-Com. W. W. Reisinger, U. S. N.

1891.

The Enlistment, Training and Organization of Crews for our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U. S. N.

DISPOSITION AND EMPLOYMENT OF THE FLEET: SHIP AND SQUADRON DRILL. Honorable Mention, 1891. By Lieutenant R. C. Smith, U. S. N.

1892.

Torpedo-boats: their Organization and Conduct. Prize Essay, 1892. By Wm. Laird Clowes.

1894.

The U.S.S. Vesuvius, with Special Reference to her Pneumatic Battery. Prize Essay, 1894. By Lieut.-Com. Seaton Schroeder, U. S. N.

NAVAL REFORM. Honorable Mention, 1894. By Passed Assistant Engineer F. M. Bennett, U. S. N.

1895.

Tactical Problems in Naval Warfare. Prize Essay, 1895. By Lieut.-Com. Richard Wainwright, U. S. N.

A SUMMARY OF THE SITUATION AND OUTLOOK IN EUROPE. An Introduction to the Study of Coming War. Honorable Mention, 1895. By Richmond Pearson Hobson, Assistant Naval Constructor, U. S. N.

SUGGESTIONS FOR INCREASING THE EFFICIENCY OF OUR NEW SHIPS. Honorable Mention, 1895. By Naval Constructor Wm. J. Baxter, U. S. N.

THE BATTLE OF THE YALU. Honorable Mention, 1895. By Ensign Frank Marble, U. S. N.

1896.

The Tactics of Ships in the Line of Battle. Prize Essay, 1896. By Lieutenant A. P. Niblack, U. S. N.

THE ORGANIZATION, TRAINING AND DISCIPLINE OF THE NAVY PERSONNEL AS VIEWED FROM THE SHIP. Honorable Mention, 1896. By Lieutenant Wm. F. Fullam, U. S. N.

NAVAL APPRENTICES, INDUCEMENTS, ENLISTING AND TRAINING. The Seaman Branch of the Navy. Honorable Mention, 1896. By Ensign Ryland D. Tisdale, U. S. N.

THE COMPOSITION OF THE FLEET. Honorable Mention, 1896. By Lieutenant John M. Ellicott, U. S. N.

1897.

Torpedo-boat Policy. Prize Essay, 1897. By Lieutenant R. C. Smith, U. S. N.

A PROPOSED UNIFORM COURSE OF INSTRUCTION FOR THE NAVAL MILITIA. Honorable Mention, 1897. By H. G. Dohrman, Associate Member, U. S. N. I.

TORPEDOES IN EXERCISE AND BATTLE. Honorable Mention, 1897. By Lieutenant J. M. Ellicott, U. S. N.

1898.

Esprit de Corps: A Tract for the Times. Prize Essay, 1898. By Captain Caspar Frederick Goodrich, U. S. N.

OUR NAVAL POWER. Honorable Mention, 1898. By Lieut.-Com. Richard Wainwright, U. S. N.

TARGET PRACTICE AND THE TRAINING OF GUN CAPTAINS. Honorable Mention, 1898. By Ensign R. H. Jackson, U. S. N.

1900.

Torpedo Craft: Types and Employment. Prize Essay, 1900. By Lieutenant R. H. Jackson, U. S. N.

THE AUTOMOBILE TORPEDO AND ITS USES. Honorable Mention, 1900. By Lieutenant L. H. Chandler, U. S. N.

1901.

Naval Administration and Organization. Prize Essay, 1901. By Lieutenant John Hood, U. S. N.

1903.

Gunnery in Our Navy. The Causes of its Inferiority and Their Remedies. Prize Essay, 1903. By Professor Philip R. Alger, U. S. N.

A NAVAL TRAINING POLICY AND SYSTEM. Honorable Mention, 1903. By Lieutenant James H. Reid, U. S. N.

SYSTEMATIC TRAINING OF THE ENLISTED PERSONNEL OF THE NAVY. Honorable Mention, 1903. By Lieutenant C. L. Hussey, U. S. N.

OUR TORPEDO-BOAT FLOTILLA. The Training Needed to Insure its Efficiency. Honorable Mention, 1903. By Lieutenant E. L. Beach, U. S. N.

1904.

The Fleet and Its Personnel. Prize Essay, 1904. By Lieutenant S. P. Fullinwider, U. S. N.

A PLEA FOR A HIGHER PHYSICAL, MORAL AND INTELLECTUAL STANDARD OF THE PERSONNEL FOR THE NAVY. Honorable Mention, 1904. By Medical Inspector Howard E. Ames, U. S. N.

1905.

American Naval Policy. Prize Essay, 1905. By Commander Bradley A. Fiske, U. S. N.

THE DEPARTMENT OF THE NAVY. Honorable Mention, 1905. By Rear-Admiral Stephen B. Luce, U. S. N.

1906.

Promotion by Selection. Prize Essay, 1906. By Commander Hawley O. Rittenhouse, U. S. N.

THE ELEMENTS OF FLEET TACTICS. First Honorable Mention, 1906. By Lieut.-Com. A. P. Niblack, U. S. N.

GLEANINGS FROM THE SEA OF JAPAN. Second Honorable Mention, 1906. By Captain Seaton Schroeder, U. S. N.

THE PURCHASE SYSTEM OF THE NAVY. Third Honorable Mention, 1906. By Pay Inspector J. A. Mudd, U. S. N.

1907.

Storekeeping at the Navy Yards. Prize Essay, 1907. By Pay Inspector John A. Mudd, U. S. N.

BATTLE REHEARSALS. A few thoughts on our next step in Fleet-Gunnery. First Honorable Mention, 1907. By Lieut.-Comdr. Yates Stirling, U. S. N.

THE NAVAL PROFESSION. Second Honorable Mention, 1907. By Commander Bradley A. Fiske, U. S. N.

1908.

A Few Hints to the Study of Naval Tactics. Prize Essay, 1908. By Lieutenant W. S. Pye, U. S. N.

THE MONEY FOR THE NAVY. First Honorable Mention, 1908. By Pay Inspector John A. Mudd, U. S. N.

THE NATION'S DEFENSE—THE OFFENSIVE FLEET. How Shall We Prepare It for Battle? Second Honorable Mention, 1908. By Lieut.-Commander Yates Stirling, U. S. N.

1909.

Some Ideas about Organization on Board Ship. Prize Essay, 1909. By Lieutenant Ernest J. King, U. S. N.

THE NAVY AND COAST DEFENCE. Honorable Mention, 1909. By Commodore W. H. Beehler, U. S. N.

THE REORGANIZATION OF THE NAVAL ESTABLISHMENT. Honorable Mention, 1909. By Pay Inspector J. A. Mudd, U. S. N.

A PLEA FOR PHYSICAL TRAINING IN THE NAVY. Honorable Mention, 1909. By Commander A. P. Niblack, U. S. N.

1910.

The Merchant Marine and the Navy. Prize Essay, 1910. By Naval Constructor T. G. Roberts, U. S. N.

THE NAVAL STRATEGY OF THE RUSSO-JAPANESE WAR. Honorable Mention, 1910. By Lieutenant Lyman A. Cotten, U. S. N.

1911.

Navy Yard Economy. Prize Essay, 1911. By Paymaster Charles Conard, U. S. N.

NAVAL POWER. Honorable Mention, 1911. By Captain Bradley A. Fiske, U. S. N.

WANTED—FIRST AID. Honorable Mention, 1911. By Commander C. C. Marsh, U. S. N.

NOTICE.

The U. S. Naval Institute was established in 1873, having for its object the advancement of professional and scientific knowledge in the Navy. It now enters upon its thirty-eighth year of existence, trusting as heretofore for its support to the officers and friends of the Navy. The members of the Board of Control cordially invite the co-operation and aid of their brother officers and others interested in the Navy, in furtherance of the aims of the Institute. by the contribution of papers and communications upon subjects of interest to the naval profession, as well as by personal support and influence.

On the subject of membership the Constitution reads as follows:

ARTICLE VII.

Sec. 1. The Institute shall consist of regular, life, honorary, and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fees to the Secretary and Treasurer. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

Sec. 3. The Prize Essayist of each year shall be a life member without payment of fee.

Sec. 4. Honorary members shall be selected from distinguished Naval and Military Officers, and from eminent men of learning in civil life. The Secretary of the Navy shall be, *ex officio*, an honorary member. Their number shall not exceed thirty (30). Nominations for honorary members must be favorably reported by the Board of Control, and a vote equal to one-half the number of regular and life members, given by proxy or presence, shall be cast, a majority electing.

Sec. 5. Associate members shall be elected from Officers of the Army, Revenue Cutter Service, foreign officers of the Naval and Military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Sec. 6. Those entitled to become associate members may be elected life members, provided that the number not officially connected with the Navy and Marine Corps shall not at any time exceed one hundred (100).

Sec. 7. Associate members and life members, other than those entitled to regular membership, shall be elected as follows: "Nominations shall be made in writing to the Secretary and Treasurer, with the name of the member making them, and such nominations shall be submitted to the Board of Control, and, if their report be favorable, the Secretary and Treasurer shall make known the result at the next meeting of the Institute, and a vote shall then be taken, a majority of votes cast by members present electing."

The Proceedings are published quarterly and anyone may subscribe for them. The annual subscription is $3.00; single copies, 75 cents. Annual dues for members and associate members, $2.00. Fee for life membership, $30.00.

All letters should be addressed U. S. Naval Institute, Annapolis, Md., and all checks, drafts, and money orders should be made payable to the same.

SPECIAL NOTICE.

NAVAL INSTITUTE PRIZE ESSAY, 1911.

A prize of two hundred dollars, with a gold medal, and a life-membership in the Institute, is offered by the Naval Institute for the best essay presented on any subject pertaining to the naval profession, subject to the following rules:

1. The award for the prize shall be made by the Board of Control, voting by ballot and without knowledge of the names of the competitors.

2. Each competitor to send his essay in a sealed envelope to the Secretary and Treasurer on or before January 1, 1912. The name of the writer shall not be given in this envelope, but instead thereof a motto. Accompanying the essay a separate sealed envelope will be sent to the Secretary and Treasurer, with the motto on the outside and writer's name and motto inside. This envelope is not to be opened until after the decision of the Board.

3. The successful essay to be published in the Proceedings of the Institute; and the essays of other competitors, receiving honorable mention, to be published also, at the discretion of the Board of Control; and no change shall be made in the text of any competitive essay, published in the Proceedings of the Institute, after it leaves the hands of the Board.

4. If, in the opinion of the Board of Control, the best essay presented is not of sufficient merit to be awarded the prize, it may receive "Honorable Mention" or such other distinction as the Board may decide.

5. In case one or more essays receive "Honorable Mention," the writer of the first of them in order of merit will receive seventy-five dollars and a life-membership in the Institute.

6. Any essay not having received honorable mention may be published also, at the discretion of the Board of Control, but only with the consent of the author.

7. The essay is limited to fifty (50) printed pages of the Proceedings of the Institute.

8. All essays submitted must be either typewritten or copied in a clear and legible hand.

9. In the event of the prize being awarded to the winner of a previous year, a gold clasp, suitably engraved, will be given in lieu of the gold medal.

By direction of the Board of Control.

PHILIP R. ALGER,
Professor, U. S. N., Secretary and Treasurer.